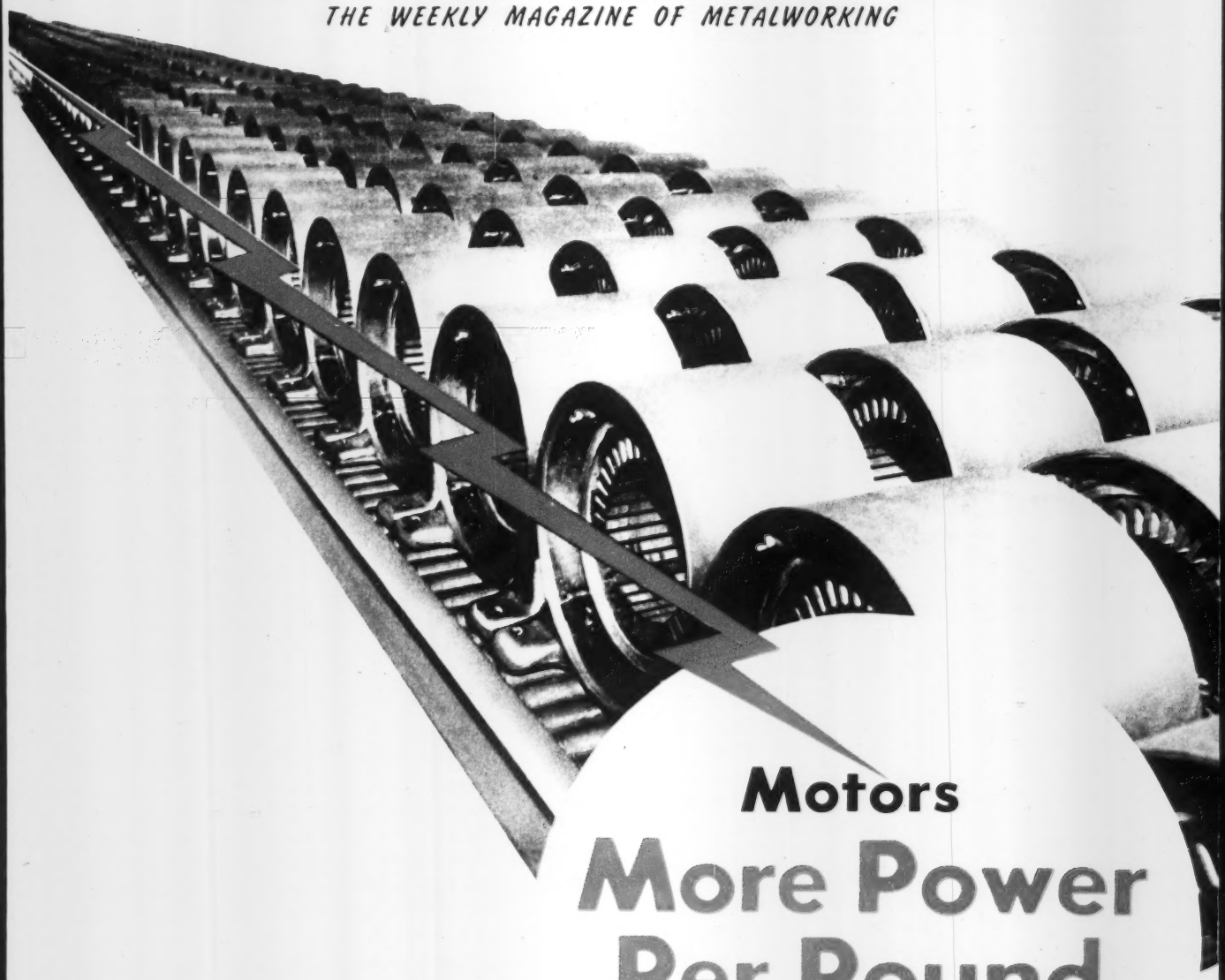
SEPTEMBER 21, 1953

STEEL

THE WEEKLY MAGAZINE OF METALWORKING



Motors
More Power Per Pound

Progress Shrinks Frames, p. 128

✓ INVENTORY SHAKE-OUT
Adjustment, No Recession, p. 85

✓ METAL FOIL
Prospects Shiny, p. 87

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Take a closer look at the

FORMABILITY

of B&W mechanical tubing *You'll like it*

When selecting tubing for forming into any part or product, the fabricator should be certain that the tubing has the optimum combination of formability and structural strength required by the product . . . should also consider the ease with which it can be formed—hot or cold—with his available equipment.

Whether you specialize in forming, or fabricate formed specialties only occasionally, B&W Mechanical tubing can be supplied to meet the specific requirements of practically any end use. It is available in the broadest range of analyses, sizes, finishes, and properties, to simplify and reduce your forming operations to the minimum consistent with product requirements.

Mr. Tubes — your nearby B&W Tube Representative — is always available when you need help in matching tubing types to your facilities and job requirements. Get the benefit of his long, close association with mechanical applications of every type, to keep your production up and costs down.

B&W SEAMLESS and WELDED TUBES

THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION
Beaver Falls, Pa.—Seamless Tubing; Welded Stainless Steel Tubing
Alliance, Ohio—Welded Carbon Steel Tubing

TA-1750(M)

The Chesapeake Bay Bridge is the third longest in the world, and the first to span Chesapeake Bay. *Owner:* Maryland State Roads Commission. *Designers and Supervising Engineers:* J. E. Greiner Company. *Fabricators and Erectors of Superstructure:* Bethlehem Steel Company.

Bridge Piers Protected by Mayari R Cylinders

Fifty-seven of the concrete piers that carry the Chesapeake Bay Bridge are protected by Mayari R steel.

The circular concrete shafts of these piers are encased in cylinders of Mayari R plate, extending from a point 5 ft above the mean water line to a point 5 ft below on some, and 2 ft below on others depending upon the location. Mayari R plate is also used to enclose the concrete web members that connect some of these shafts at the water line. These plate sections were fabricated and welded on shore, then lowered into position, where they served as forms for pouring tremie concrete.

These steel sections protect the concrete from any damage that might be caused by floating objects, or by the action of salt water. Mayari R was selected because of its excellent resistance to corrosion and abrasion.

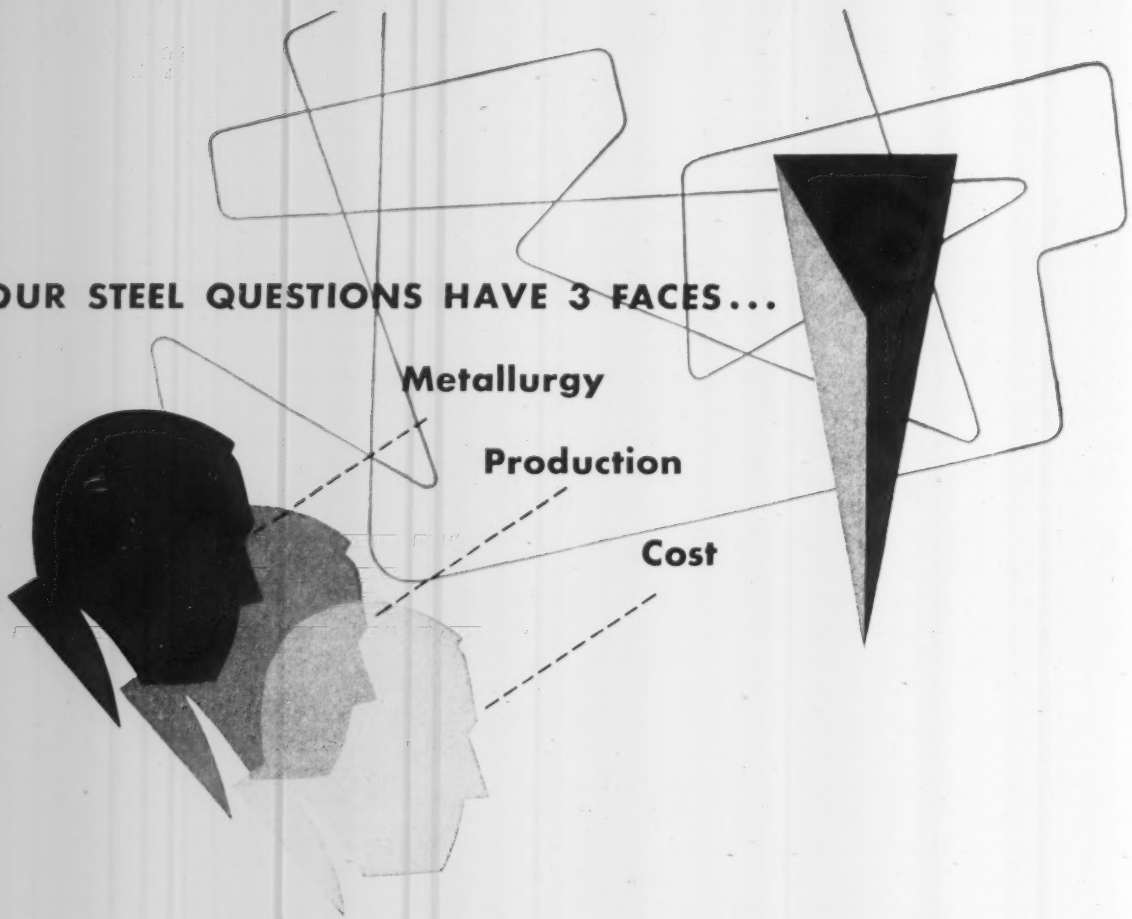
Tests made in industrial atmosphere as well as in brine solutions show that Mayari R has better corrosion-resistance than iron, carbon steel, or copper-bearing steel. For more information on the corrosion-resistance and mechanical properties of low-alloy, high-strength Mayari R get in touch with any Bethlehem Sales office.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

Mayari R *makes it lighter... stronger... longer lasting*



REPUBLIC 3-DIMENSION METALLURGICAL SERVICE

WRITE FOR this booklet of case histories on "Republic Alloy Steels, and How to Get the Most Out of Them."

LOOKS AT ALL THREE—Whatever you make . . . or plan to make . . . these 3 questions dictate your decision on steel grades. When leading fabricators, small or large, have any question about the right answer, they call in a Republic Field Metallurgist. They know that his final recommendations on alloys, machining, and heat-treating procedures will include the opinions of the other two members of the Republic 3-Dimension Metallurgical Service team . . . a Mill Metallurgist and a Laboratory Metallurgist.

Your metallurgist and production manager may be stumped by a steel problem. Or may want confirmation of steel grades or heat treatment. Ask your Republic salesman to call in Republic's 3-Dimension Metallurgical Service. It is yours to use.

REPUBLIC STEEL CORPORATION
Alloy Steel Division • Massillon, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

Republic ALLOY STEELS

REPUBLIC STEEL

Other Republic Products include Carbon and Stainless Steels—Sheets, Strip, Plates, Pipe, Bars, Wire, Pig Iron, Bolts and Nuts, Tubing

HOBART

This multi-purpose electrode simplifies your work

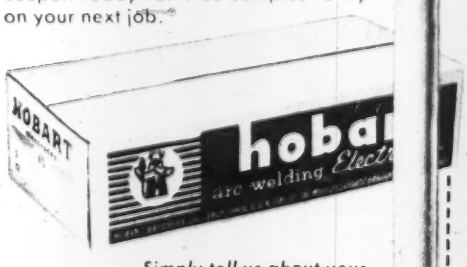
The Hobart "12" is the best all-position electrode money can buy. It's designed for welding in any position, flat, vertical or overhead.

Many of the country's largest fabricators of tanks, automobile frames, agricultural implements, etc., have standardized on the Hobart "12"—because it handles over 80% of all their production work. One of the many reasons for the "12's" success is that it can operate efficiently on a very high welding current, making it possible to increase welding speeds.

Even under these high currents, the "12" exhibits a smooth, stable arc, and a remarkably low spatter loss, which means a big savings on stub loss and cleanup time—while you get more deposited metal per electrode.

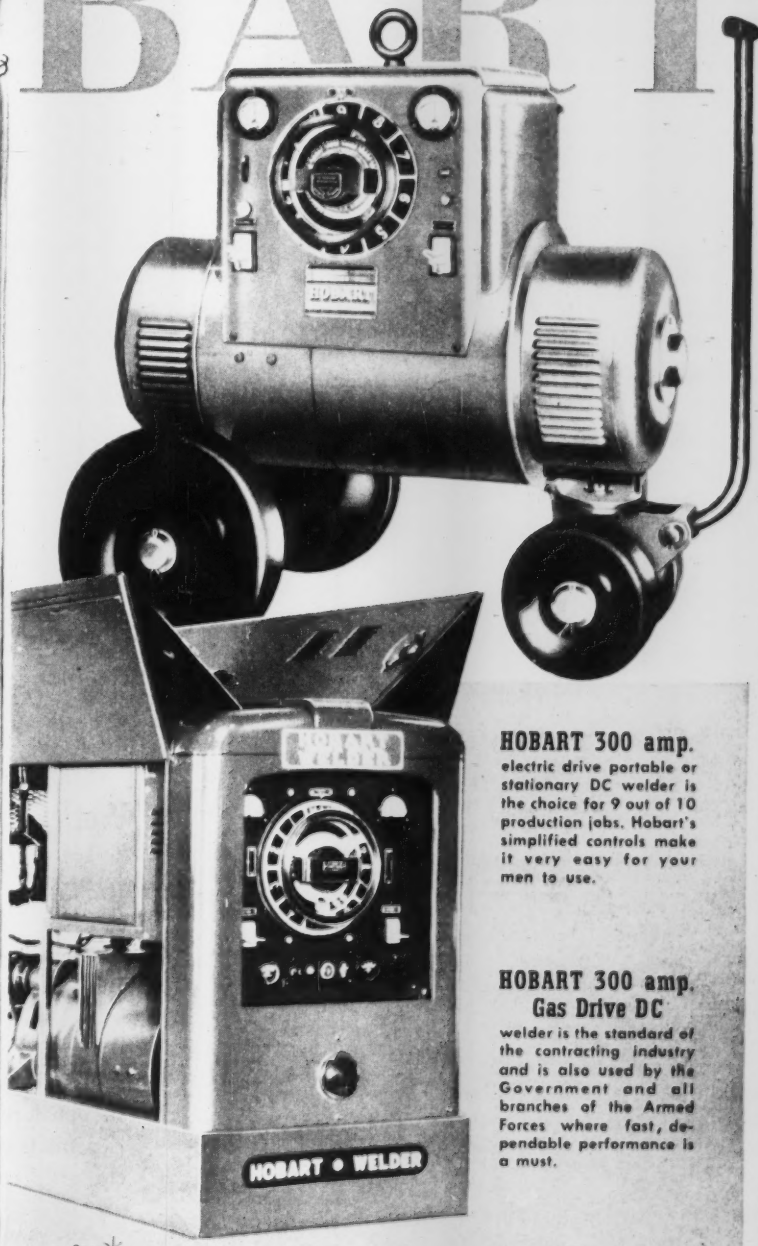
The Hobart "12" is outstanding for its fast production and fabrication work. It's equally efficient for maintenance work too, because its ductility, tensile strength, and unusually high uniform physical strength are well above the minimum requirements.

Just another example of how a Hobart electrode is designed to give you better, faster welds at lower cost. Why not give it a chance to prove its merits on your work? Check and mail coupon today for free samples to try on your next job.



Samples Free!

Simply tell us about your work and we'll recommend the electrode best suited to your needs—and send you FREE samples to try on your next job. Fill out and mail coupon today.



HOBART 300 amp. electric drive portable or stationary DC welder is the choice for 9 out of 10 production jobs. Hobart's simplified controls make it very easy for your men to use.

HOBART 300 amp. Gas Drive DC welder is the standard of the contracting industry and is also used by the Government and all branches of the Armed Forces where fast, dependable performance is a must.

Hobart Brothers Company
Box ST-93 Troy, Ohio
One of the world's largest builders of arc welders

HOBART BROTHERS COMPANY, BOX ST-93 TROY, OHIO

Without obligation, please send information on items checked below.

- ☐ Gas Drive Welder
- ☐ Electric Drive Welder
- ☐ Pipeliner Welder
- ☐ Bantam Champ Welder

Send me— ☐ Electrode Samples ☐ Electrode Catalog ☐ Accessories Catalog

Our work is _____

Name _____ Position _____

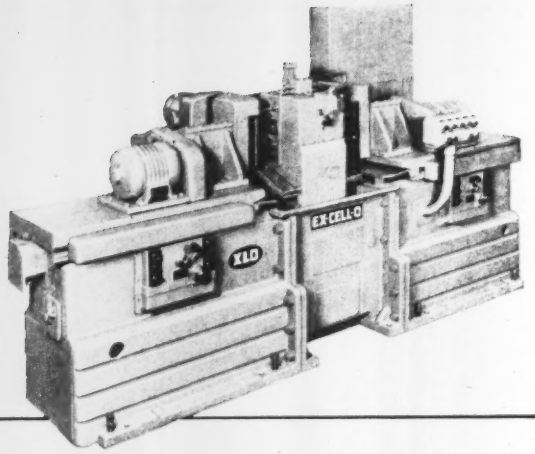
Firm _____

Address _____

HOBART WELDERS, ELECTRODES

822

PIECES PER HOUR



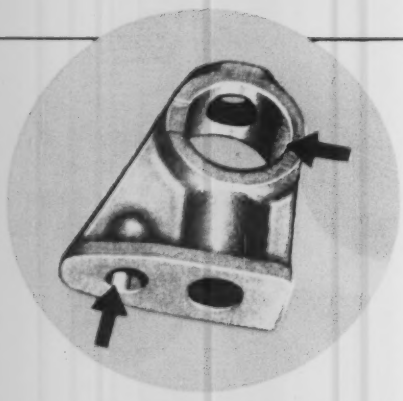
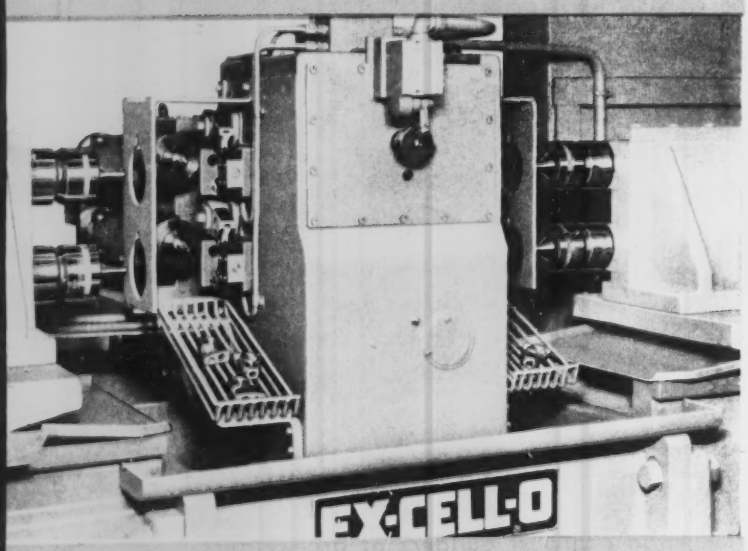


Photo above shows one of the die-cast aluminum workpieces. Arrows point to the bored holes which are held to plus or minus .0005". Four parts are machined during each cycle, netting 822 pieces per hour.



Two parts are held in each side of the fixture. Left and right slides bore $^{13}/_{16}$" diameter hole through each part, while rear slide is boring $^{5}/_{16}$" blind holes at right angles to the others. The work is unclamped and ejected automatically at the end of the machining cycle.

FROM THIS EX-CELL-O 3-Way Machine

Works From 3 Directions Simultaneously

This Ex-Cell-O three-Way Precision Boring Machine consists of three standard, self-contained way units joined to a center section. The left and right way units have two spindles each, mounted one above the other on angle plate brackets. The rear unit carries four spindles, two on each side. The center section supports a fixture accommodating two parts on each side. Work is clamped and ejected hydraulically.

Ask your local Ex-Cell-O representative about all the other advantages of Ex-Cell-O Way Machines, or write today for Bulletin 31631.

XLO

EX-CELL-O CORPORATION

DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • CUTTING TOOLS RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

53-22

This Week in Metalworking

STEEL

Vol. 133 No. 12 September 21, 1953

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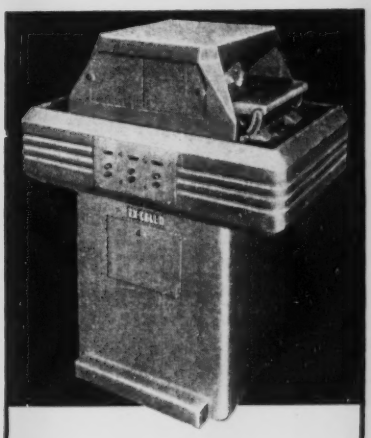
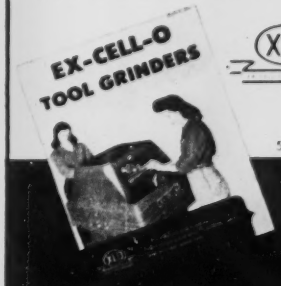


This Sturdy Precision

Tool Grinder

STYLE 44-A, is the newest in a complete line made by Ex-Cell-O for sharpening carbides, high speed steels, and cast alloys. All are double end models, equipped for face grinding on cup type wheels; for efficient and economical conditioning of single-point tools.

BULLETIN 46262, pictured below, shows and describes models for large plants or small shops; also gives important data on tool grinding. Ask Ex-Cell-O to send you a free copy. Write for it today.



For Better Work and Longer Life—

TOOL GRINDERS

BY

EX-CELL-O CORPORATION

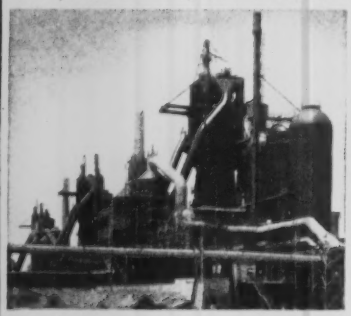
Detroit 32, Michigan

(Advertisement)

what's NEW in Engineering

An automatic welding machine, developed by a Michigan company, is claimed to duplicate the work of dozens of human welders. The octopus-like machine generates temperatures of 2000° F.; is water cooled. One operator can make 62 simultaneous welds with it. In one minute it can perform 744 weld operations.

Reducing coke consumption while increasing pig iron production was the dual problem facing Kaiser Engineers in designing and building blast furnaces for a California steel plant. A courageous new furnace

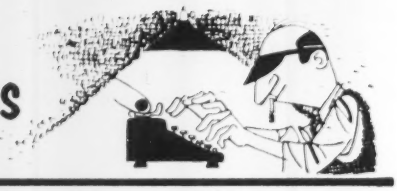


design gave record results — 1,335 tons of pig iron per day on furnaces rated for 1,200 tons. These furnaces use 1,409 lbs. of coke per net ton of iron against a national average of 1600-1700 lbs. per ton. We'll send you a reprint of an article by Dr. W. C. Rueckel which tells how Kaiser Engineers attained this outstanding furnace practice — with savings in capital and operating costs through increased production.

Simplified Drafting Practice, by Healy and Rau, is a best-selling new book which outlines a modern approach to industrial drafting. The method claims to cut drafting time 30-50%; reduce large blueprints to handy pocket size.

For those clients who want general consulting engineering services, such as economic studies, evaluation, investigation of manufacturing facilities, or analysis of operating costs, the full engineering experience of Kaiser Engineers is available. Call or write: Kaiser Engineers Division of Henry J. Kaiser Company, Kaiser Building, Oakland 12, California.

behind the scenes



Good Old Days?

In a couple of minutes, you can turn a few dozen pages to the east of here and find out what is happening and what will happen in metalworking, but first let's take a few seconds to recall what has occurred.

We've just been down to the archives, perusing the Sept. 18, 1933, issue of STEEL. That issue of 20 years ago reported that the steel ingot operating rate had dropped to 41 per cent of capacity; it's in the 90s now. Two decades ago, STEEL reported, July auto and truck production was 233,088 units; it was 757,595 this July. The Sept. 18, 1933, book reported freight car loadings at 666,652 in the week ended Sept. 2; they're topping 800,000 a week regularly now.

Feel better? Well, then, the steel industry's basic labor rate two decades ago was 40 cents an hour. It's $1.52 now.

You Never Know

While we're in this reminiscing mood, let's jump five years ahead in time. Lo and behold, in Behind the Scenes, of all places, on Sept. 19, 1938, we come across this bit of information:

"A reader predicts that the government will spend over $1 billion a month in 1939."

Then this character, Shrdlu, went on to be slightly skeptical. Shrdlu, you fool. The government is spending about $1 billion a week now on defense alone.

Hurrah for LDAWLWCA

We are in receipt of an epistle which, after the conventional address at the top, starts off without the age-old Dear So and So. Instead, the author gets right down to business and says: "Your problem of Sept. 7, Shrdlu, took a full four minutes of skill and ingenuity by the undersigned. Please, let us have some easier problems." The letter then ended with the gentleman's signature, minus that age-old "Very truly yours," "Sincerely yours," etc.

We liked the letter. We liked the style. Why say, "Dear Ignatz," when you never cared much for Ignatz anyway? And why say you are truly his, when you belong to no man? We hereby form an organization entitled, Let's Do Away with Letter-Writing Conventions of America Inc.

If you want to be a member, all you need do is write us an epistle—without the tedious conventions—stating that you want to join LDAWLWCA, and we'll add you to our rolls. If we receive your letter within 60 days, you can be a charter member and a vice president, too. Next year, we're going to tackle the matter of reforming the spelling.

Music, Comrade

Our European correspondent Behind the Iron Curtain reports that Soviet bards have decided to sing more emphatically about heavy industry.

At a conference of poets and composers it was decided to produce, among other inspirational choruses, a "song of the smelters;" a "consomol metallurgical song" and a "song of subway building."

Swing it, boys, swing it.

Puzzle Corner

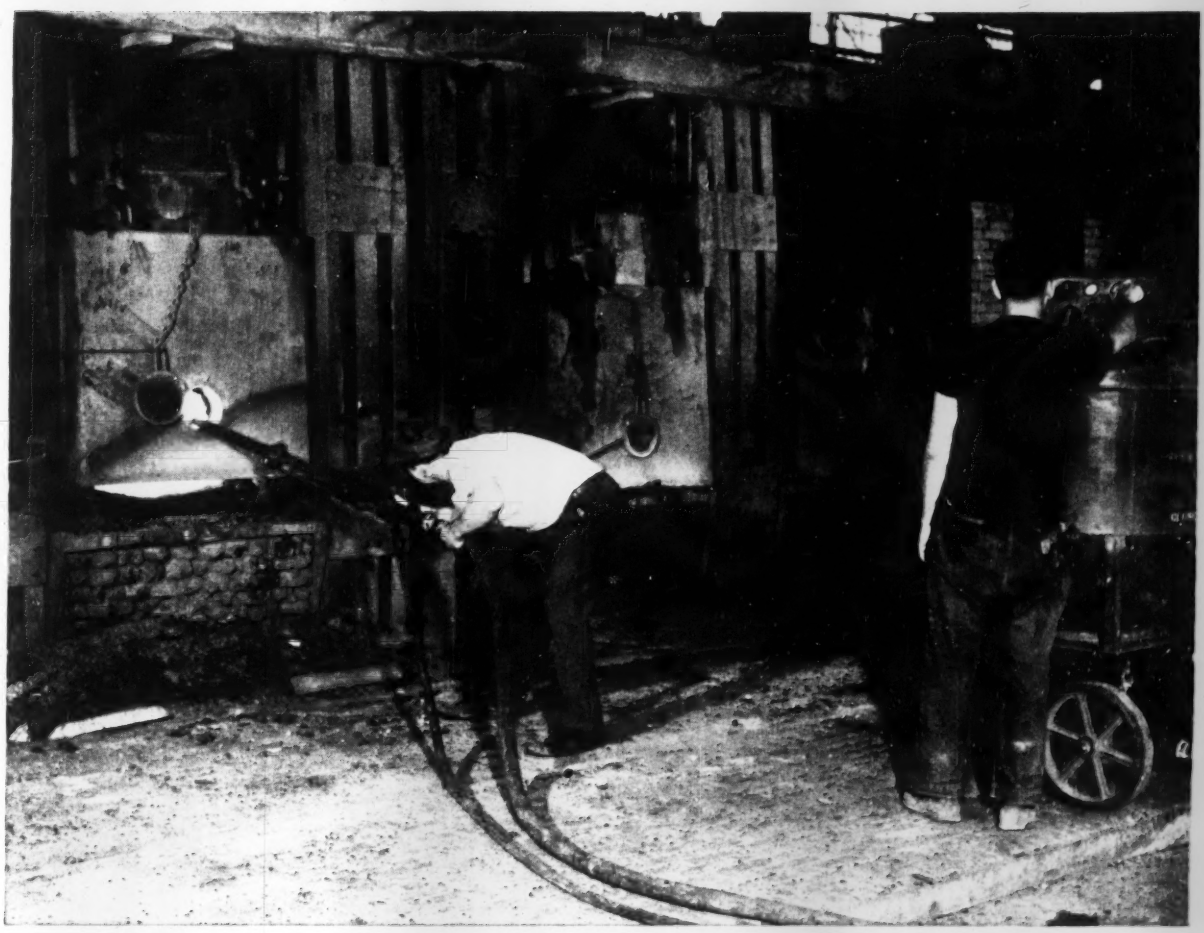
The puzzle of Sept. 7 on lentils, was simple, as our LDAWLWCA man implied. It takes 29 days to cover the area with two lentils.

Since we have been in a sort of reminiscent mood for part of this column this week, let's go way back to classical days for our next puzzle:

Heracles, the mighty, was questioning Augeas, seeking to learn the number of his herds. Augeas replied: "About the stream of Alpheius, my friend, are the half of them; the eighth part pasture around the hill of Cronos, the twelfth part far away by the precinct of Taraxippus; the twentieth part feed in holy Elis, and I left the thirtieth part in Arcadia; but here you see the remaining 50 herds.' How many herds had Augeas?

Shrdlu

(Metalworking Outlook—Page 77)



Open hearth back wall is repaired with BRI Gun and Roebling furnace stays on line 3 extra weeks

HERE is another instance in which a BRI Gun paid for itself on a single emergency job.

Shortly after John A. Roebling's Sons Corporation placed their BRI Gun in service, a section of the back wall near the skew in one of their open hearth furnaces began to erode. This section was repaired with Gundol and Gunchrome M and the furnace kept on the line for three weeks, until the furnace went down for a scheduled rebuild.

Now, fourteen months later, practically all Roebling furnace personnel are experienced in the operation of the BRI Gun and use the equipment regularly. Consequently, furnace life has been increased and the problem of skewback maintenance virtually eliminated.

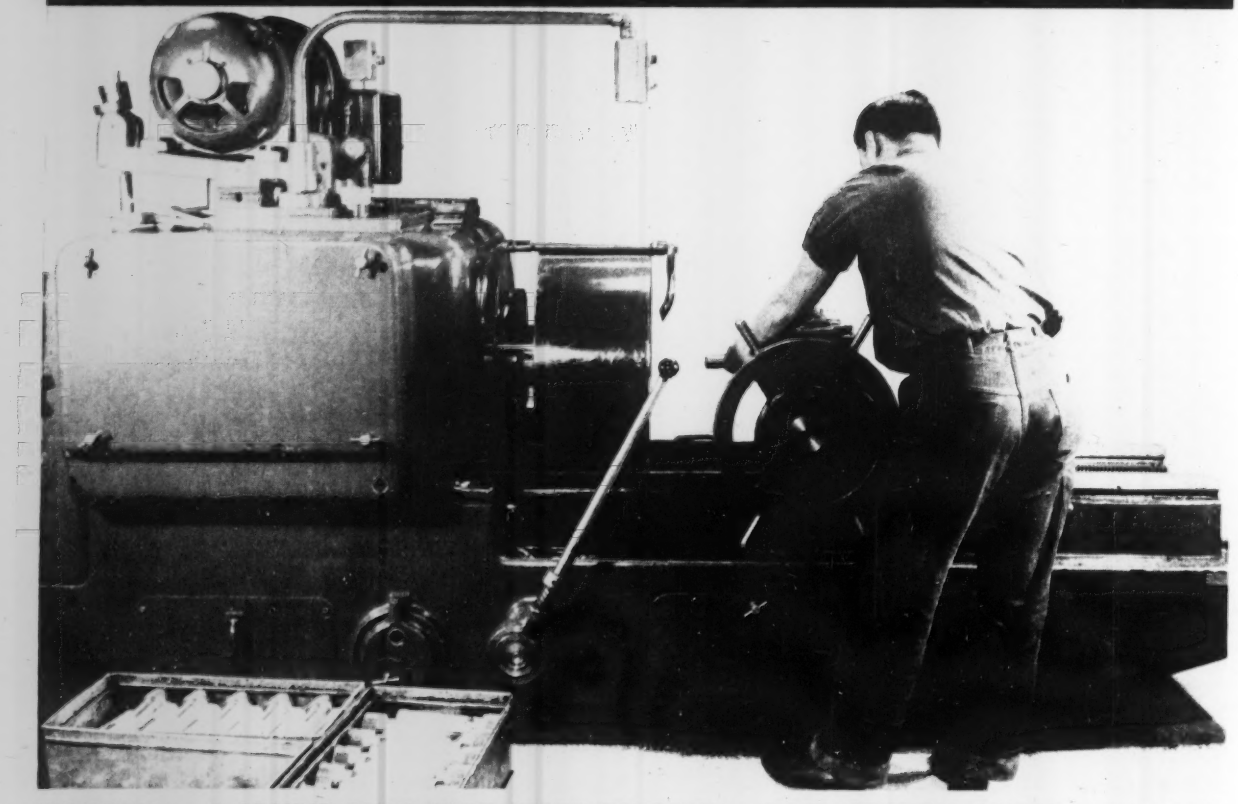
Roebling's experience confirms that of the several hundred BRI Gun owners who have found the equipment easy to operate, cheap to maintain and highly effective for making emergency as well as routine repairs.

If you are not yet sold on the gun and on Gunchrome, Gundol and Gunmix, why not ask your Basic representative for the whole story?

Basic Refractories Incorporated 845 HANNA BUILDING, CLEVELAND 15, OHIO

Exclusive Agents in Canada: REFRACTORIES ENGINEERING AND SUPPLIES, LTD., Hamilton and Montreal

A NEW LANDMACO
for Cutting Large Diameter Threads



HARDENED and GROUND WAYS • WIDE SPEED RANGE • 60% MORE GRIPPING POWER • 6" CAPACITY

A New LANDMACO Threading Machine with many improvements and new design features has been developed for heavy-duty precision threading on large diameter work. The first installation of this new LANDMACO is shown threading "Unbrako" socket head screws of TS4140 steel at the Standard Pressed Steel Company, Jenkintown, Pa. 1½" diameter 12 pitch UN threads are being cut 2 29/32" long to a Class 3 fit.

The carriage front, based on a new principle, assures proper work alignment under gripping pressure and gives 60% more gripping efficiency. Heavy hardened and ground rectangular ways firmly guide and support the carriage.

A single gear shift lever is provided for a rapid speed change of 25% for any given spindle speed as determined by the speed change gears in use. Three pairs of speed change gears provide twelve spindle speeds ranging from 9 to 152 revolutions per minute.

This machine is equipped with either the 4" Standard Rotary Head or the new 6" (6-chaser) Lanco Head. It will cut bolt threads from 1½" to 6⅝" in diameter, and pipe threads from 1" to 6" in diameter. Maximum thread length is 29" with leadscrew and 30" without leadscrew.

For more complete information on this **new** LANDMACO Threading Machine, write for Bulletin #H-45. 381

THE LANDIS *Machine* CO. 50th ANNIVERSARY **WAYNESBORO PENNSYLVANIA**

NATIONAL METAL EXPOSITION

THE BIG METAL SHOW

Champion — in the Metals Market Place of the World!

Unmatched anywhere in the world for intensity of interest . . . for wealth of ideas and basic appeal . . . the National Metal Exposition in Cleveland's Public Hall this October, will be host to another record-breaking audience of metals industries people . . . intent upon seeing the newest . . . the finest . . . the most wanted developments America's industrial genius has created. For every man interested in metals, this champion of all industrial expositions offers *more of everything!*

NATIONAL METALS EXPOSITION

NATIONAL METAL CONGRESS

CLEVELAND, OHIO • OCTOBER 19-23

END-WELDS STUDS TO STEEL IN A SPLIT-SECOND
ELIMINATES DRILLING, TAPPING, HAND WELDING
REDUCES MATERIAL HANDLING—TAKES THE TOOL TO THE WORK
SAVES STEEL—ELIMINATES HEAVY BOSSES AND FLANGES
IMPROVES PRODUCT DESIGN AND QUALITY
TAKE ADVANTAGE OF
NELWELD COST SAVINGS
IN STEEL FABRICATION

TO HANG....TO HANDLE....TO HOLD..
Faster installation of brackets or hangers for piping, tubing or conduit.
Fast installation of handling accessories that can be easily removed.
Split second stud welding lowers fabrication costs, improves product.

THE NELSON FASTENING ENGINEER WILL SHOW YOU

. . . right in your own plant how your production and your products can be improved with this modern fastening method. Your design and production men can actually participate and test the results on your own products.

For full information on Nelweld as applied to steel fabrication, write the Main Office, Lorain, Ohio.

Fasten it Better...at Less Cost, with NELWELD

NELSON STUD WELDING

DIVISION OF GREGORY INDUSTRIES, INC., LORAIN, OHIO

LETTERS
TO THE EDITORS

Foremen Hold the Key

I would like to receive the monthly "Employee Relations Bulletin" in which appears from time to time the "Scrapbook for Supervisors" compiled by the National Foremen's Institute.

This bulletin is mentioned in your article "Your Key to Good Plant Discipline: The Foremen" (Aug. 24, p. 49). But no address is given from which to order.

Marvin Van Kirk
foreman, Forge Division
Ingersoll-Rand Co.
Phillipsburg, N. J.

• *For information on the monthly "Employee Relations Bulletin" write: A. C. Croft, president, National Foremen's Institute, New London, Conn.—ED.*

Being regular subscribers to STEEL, we have noted with interest the article entitled "Your Key to Good Plant Discipline: The Foremen". We'd like 24 reprints if they're available.

K. M. Dewar
superintendent underground mining
Steep Rock Iron Mines Ltd.
Steep Rock Lake, Ont.

Please send me 25 copies of this article . . .

Orvid G. Erickson
assistant personnel manager
Black-Clawson Co.
Hamilton, O.

Would you please send me 25 tear sheets . . .

G. E. Klock
plant manager
Sylvania Electric Products Inc.
Emporium, Pa.

• *Sent.—ED.*

Miss the Car of the Week?

I have enjoyed the feature article in your magazine called "Mirrors of Motordom" and the feature for some weeks called "Car of the Week." At the conclusion of this series in the Aug. 14 issue I find that I don't have the complete 18 articles.

I would appreciate having tear sheets of the articles dealing with the following cars: Packard, Chevrolet, Chrysler, Dodge and Hudson.

Joe J. Summers
Commercial Engineering & Products Co.
Houston, Tex.

• *Sent.—ED.*

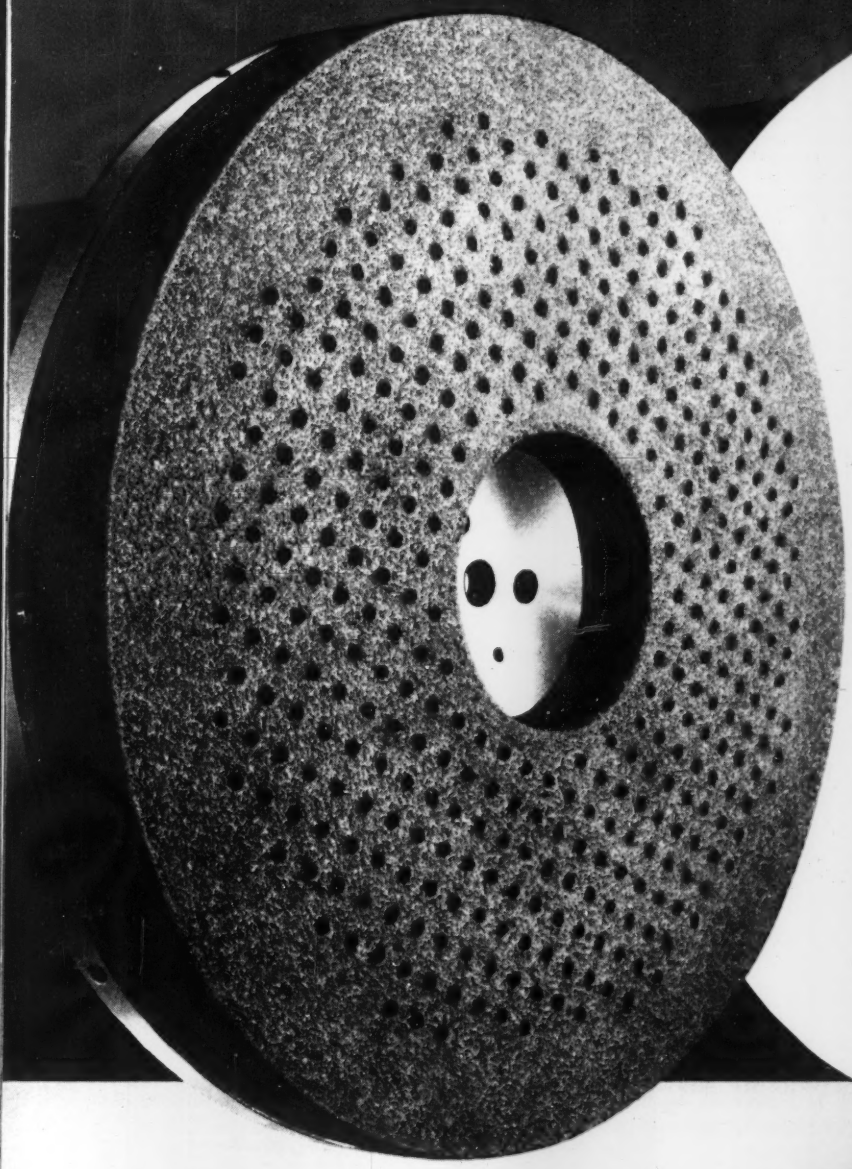
Challenge to Open Hearths

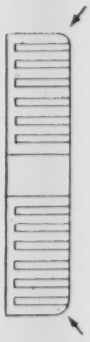
We noted with great interest your article entitled "Open Hearth Challenged as More Carbon Steel Goes Electric"

Please turn to page 12

Gardner Abrasive Engineering

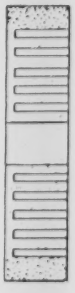
Combining two grades in one disc reduces costs and gives longer disc life





THE PROBLEM

To maintain a flat, true surface on the abrasive disc. Use of a single grade with deep corrugated face proved unsatisfactory. Outer edge of disc wore rapidly in shear cutting operation. Result: a tapered disc face, poor accuracy, frequent dressing.



THE SOLUTION

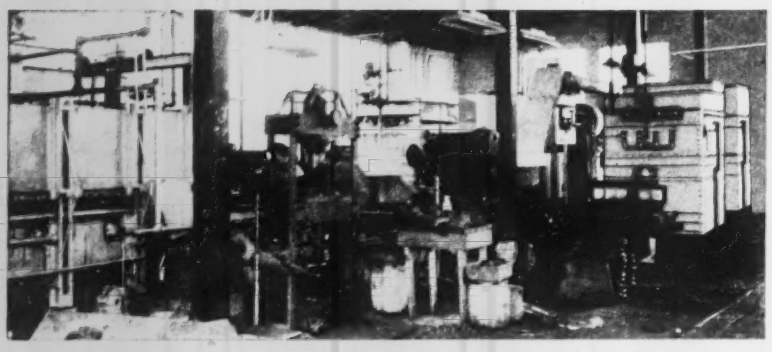
A harder grade was used for shear cut on the smooth outside area and a softer grade for the corrugated area on the inside. Result: Maximum stock removal with fast, cool cutting. Tolerances improved. Discs required less frequent dressing—lasted longer.

Gardner Abrasive Engineering offers experience derived from making both the grinding machines and the abrasive discs. It considers machine performance first and then evaluates how grade and grain of abrasive or type of disc affect grinding results. If standard abrasive discs won't do the job, discs are made *just for you.*

For help with your grinding problem, consult the Gardner Abrasive Engineer. 112A

GARDNER MACHINE COMPANY
420 Gardner St., Beloit, Wisconsin, U.S.A.

GARDNER
abrasive discs



Niagara Aero Heat Exchanger quickly pulls down the initial peak load of heat in quenching . . . and saves cooling water

Accurate control of quench bath temperatures and quickly effective capacity to handle the initial peak load of heat in quenching prevents production set-backs, increases the output of your heat treating department, prevents oil fires, saves you losses from rejected parts.

Niagara Aero Heat Exchangers give you this control in both furnace and induction hardening methods. They prevent both over-heating and over-cooling of the quench bath. Hundreds of heat treaters know they prevent many troubles, constantly improve quality and increase production.

They quickly pay for themselves by saving cooling water coils and extend your quench capacity without extra water or cooling tower.

Write for Bulletin #120 giving complete information.

NIAGARA BLOWER COMPANY

Over 35 Years' Service in Industrial Air Engineering

Dept. S., 405 Lexington Ave. New York 17, N. Y.

Experienced District Engineers in all Principal Cities of U. S. and Canada

LETTERS

Concluded from page 10

(Aug. 24, p. 84). This is to request that you grant us permission to reprint this article for circulation in this country and in Canada.

C. G. Ollinger
assistant manager
Advertising & Sales Promotion Department
National Carbon Co.
New York

• *Permission granted.—ED.*

We would appreciate 20 reprints of the article . . .

J. W. Bowman
director of purchases
Northwestern Steel & Wire Co.
Sterling, Ill.

One More Plant in the Count

Since we are producers of carbon steel and stainless steel strip, we think we should be listed in your pages recording steel prices and stainless steel mill prices. Should you agree, please advise what information you require.

Irving J. Jacobs
assistant to president
Rodney Metals Inc.
New Bedford, Mass.

• *We will be happy to include your quotations on carbon and stainless steel strip. Will you please let us know what stainless steel and carbon steel products you are marketing and what applicable current prices you are quoting. Rodney Metals Inc. will be included in* STEEL's *price pages, beginning with Sept. 14 issue.—ED.*

Conservation U.S.A.

The article "Vacuum Process Brightens Plating Picture" (Aug. 17, p. 166) is of special interest to personnel engaged in the materials conservation program of the U. S. Army Corps of Engineers.

It would aid our program if we could receive 70 copies of this article for distribution to laboratories, procurement offices and engineers of the Engineers corps. If reprints are not available, we would appreciate your permission to locally reproduce this article in exact detail for the same purpose.

assistant, procurement division
Military Supply
Office of the Chief of Engineers
Department of the Army
Washington

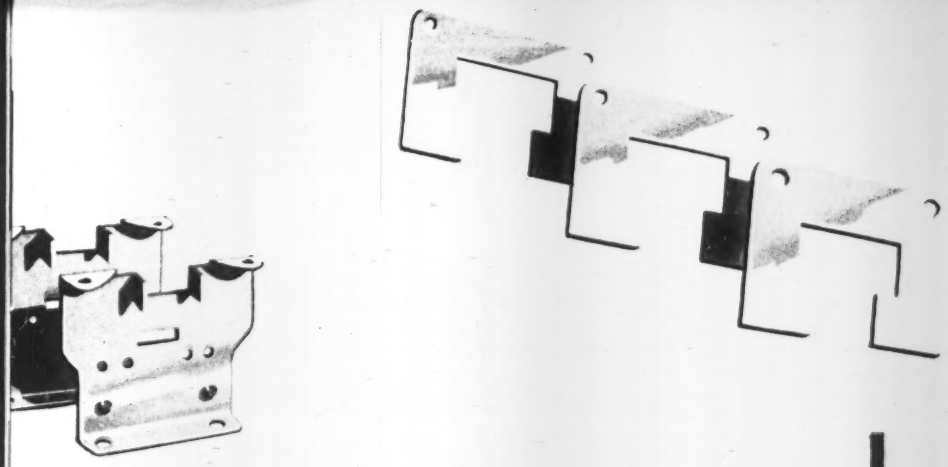
• *Permission to reproduce the article is granted.—ED.*

How To Coat Aluminum

We are quite interested in aluminum coating and would like to obtain 40 or 50 tear sheets of your article "Use the Right Process for Coating Steel with Aluminum" (Part One, Aug. 3, p. 98 and Part Two, Aug. 10, p. 138).

R. H. Shoemaker
vice president
Kolene Corp.
Detroit

• *Due to a large demand for these articles, we are able to send only 10 copies.—ED.*



Weirzin

ELECTROLYTIC ZINC-COATED STRIP

Cuts manufacturing costs!

- **Speeds production**
- **Increases die life**
- **Reduces die maintenance**

From the first day you use Weirzin you will find a marked reduction in manufacturing costs. Your production rate will increase with less time spent on die maintenance and replacement. The tight zinc-coating, electrolytically applied to Weirzin steel, actually lubricates dies without leaving a zinc deposit—thereby reducing die maintenance expense and lengthening die life.

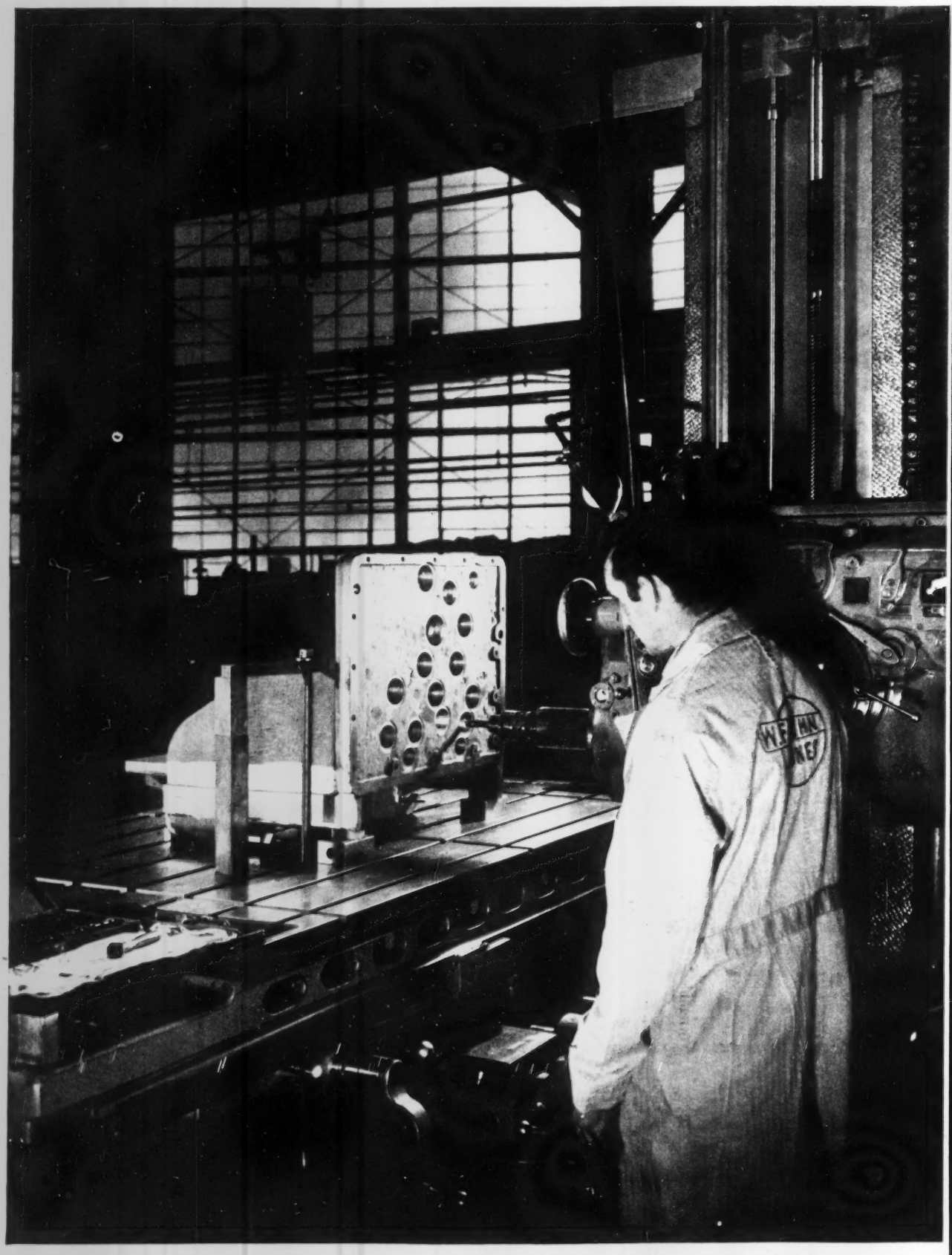
One fabricator reported a 300 per cent increase in production per set of dies after changing to Weirzin from ordinary carbon steel. This is an economy factor too great to be ignored.

Add to this the fact that the zinc coating on Weirzin will not flake, peel or powder under the most severe fabricating operations and you will quickly realize what production economies Weirzin has to offer. Write today for further information on how Weirzin can cut your manufacturing costs—and make your product a better one.

WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA

NATIONAL STEEL CORPORATION



Hairsplitting on a mass production basis!

This workpiece is positioned automatically, bored to limits within .0002", yet handled on a production basis. It's a routine job for the versatile G&L 340-T Horizontal Boring, Drilling and Milling Machine with Automatic Electric Positioning Device.

You can increase the efficiency of boring, drilling or milling operations with this ultra-precision machine. Because of its open construction and outstanding rigidity, the G&L 340-T allows you to handle either large or small work with equal precision on both production and custom run jobs. It's extremely flexible. With it, you can perform multiple operations from a single setup . . . maintain close tolerances and parallelism even though table is fully extended.

Featuring 45 easily selected speeds and 36 feeds, this standard model table-type machine delivers 20 hp, has a 4" spindle, offers a choice of three basic table and saddle arrangements. Standard bed length is 72", headstock travel on the column is 36". Cross-feed of its 36" x 72" table is 60". Larger bed, column and table sizes are also available.

What's more, these versatile machines can be equipped with the G&L Automatic Electric Positioning Device. This unit eliminates many time-consuming hours for final hand adjustments for locating work. That's because it automatically controls table and headstock movements to precise, pre-determined settings.

For complete information, see your G&L representative or write ———

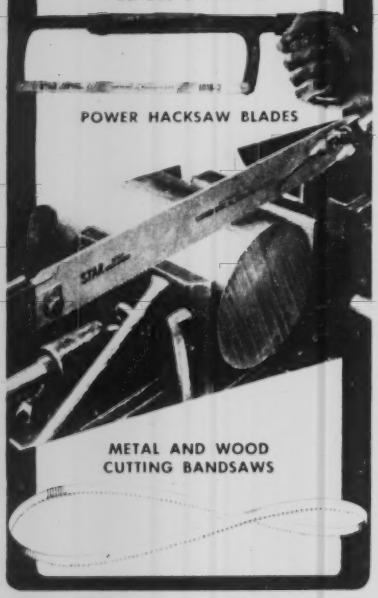
GIDDINGS & LEWIS MACHINE TOOL CO.
FOND DU LAC, WISCONSIN

Builders of the world's finest heavy-duty Horizontal Boring, Drilling and Milling Machines — table, floor and planer types; Hypro Double Housing and Open Side Planers, Planer Type Milling Machines and Vertical Boring Mills; and Davis Cutting Tools.

Photo courtesy of
The W. F. & John Barnes Co.

your STAR distributor
has whatever you
NEED
in your
METAL
CUTTING
OPERATIONS

HAND HACKSAW BLADES & FRAMES



POWER HACKSAW BLADES

METAL AND WOOD CUTTING BANDSAWS

Back of every Star Blade are 75 years of metal cutting *experience*. When you ask for Star, you get a product made of the finest steels available. You get a product made on specially designed equipment which assures *uniformity*, shipment after shipment.

Your nearby Industrial Distributor is the man to call for Star Metal Cutting Blades. He is your logical source of supply not only for Star Blades, but for all the industrial supplies you need regularly and *quickly* to keep your production running on schedule.

STAR HACK SAW BLADES 75th ANNIVERSARY 1854 1929

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CLEMSON BROS., Inc.
MIDDLETOWN, N. Y., U. S. A.
Makers of Hand and Power Hacksaw Blades, Frames, Metal and Wood Cutting Band Saw Blades and Clemson Lawn Machines

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The Weekly Magazine of Metalworking

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New facts for your file on

USS HIGH STRENGTH STEELS — UNITED STATES STEEL — TWENTY YEARS OF PERFORMANCE

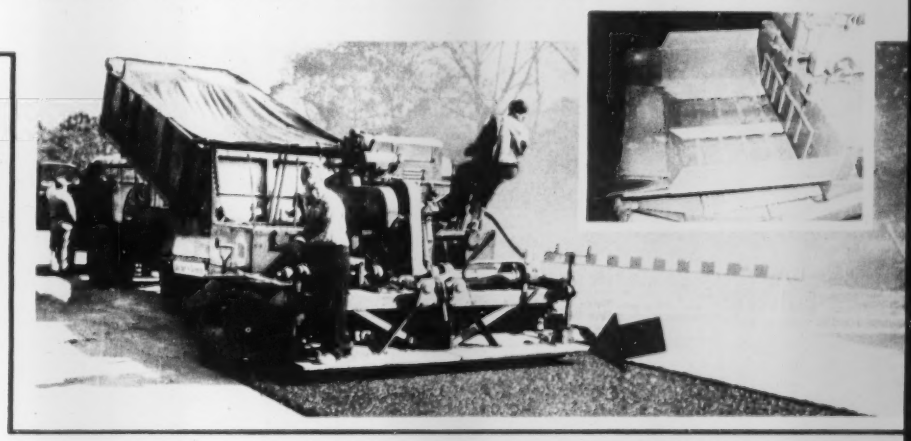
U·S·S HIGH STRENGTH STEELS

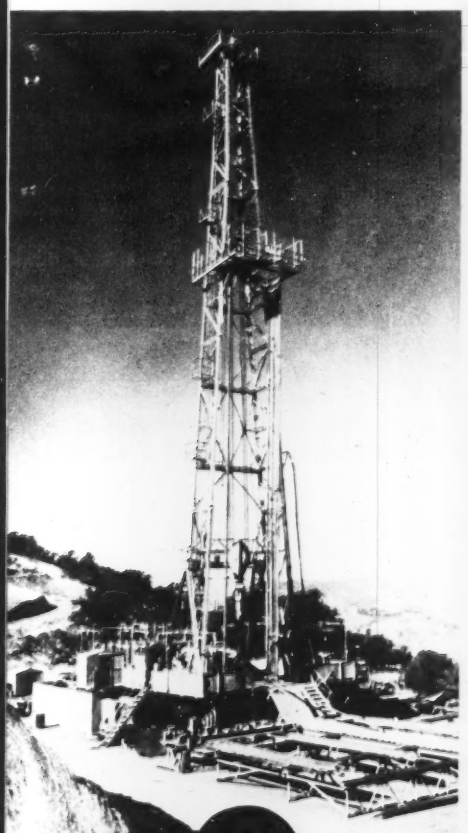
U·S·S MAN-TEN steel ensures long life of vital parts by providing strength plus high resistance to wear

● Distinguished for its performance as a road paver, the Barber-Greene Finisher tamps, levels and strikes off simultaneously—provides an unusually efficient method for laying a compact, level course of bituminous mix.

Made of ¾" MAN-TEN steel, accurately ground to flatness and highly polished, the screed plate (arrow), which rides on the laid pavement and gives it a smooth, ripple-free surface, is one of the most important components of this unit. Says the manufacturer, "Much of the success of the paving operation and the ultimate quality of the road surface reflect the quality of the material and manufacture which goes into the screed plate. That's why we use U·S·S MAN-TEN steel."

The bed of the receiving hopper is also made of U·S·S MAN-TEN steel, ¼" thick. After the load of hot mix is dumped into this hopper, chain-mounted flights draw it across the bed plates. Abrasive action is severe and the bed plates take a beating so it is imperative that they be made of especially sturdy and long-wearing material. Again MAN-TEN steel fills the bill. Its relatively low cost and easy fabricating qualities further recommend MAN-TEN steel for applications of this kind, where strength and durability are of prime importance.





By saving weight in portable masts, U·S·S MAN-TEN steel cuts costs and saves time for the oil driller

Every pound saved is of vital importance to the users of this equipment. For every time a drilling derrick or portable mast is moved, the less it weighs, the less it costs to dismantle and ship to a new location.

With masts built 25% lighter with U·S·S MAN-TEN steel, trucking costs are substantially reduced. In moving a mast from Texas to Montana, for instance, the driller might easily save two thousand dollars or more.

But lighter MAN-TEN steel construction ensures even more important savings in the greater speed with which a mast can be lowered, placed on a truck, hauled to the next site and re-erected. Here, weight saving means time saving, which means more wells drilled—more money in the driller's pocket.

That's why Lee C. Moore Corporation cantilever masts and derricks have been built lighter with U·S·S MAN-TEN ever since this high strength steel was first introduced twenty years ago. Used in the legs and principal structural members, in angle sizes ranging from 4" x 4" x ½" to 8" x 8" x 1⅛", MAN-TEN steel replaces carbon steel of almost 25% greater thicknesses. Because MAN-TEN steel has a 50% higher yield point, this lighter construction is also stronger and, thus, has a greater pulling capacity. For example, a 136' high standard derrick with a 30' base constructed of 8" x 8" x ⅞" and 8" x 8" x ½" carbon steel leg members, weighs 42,000 pounds and has a pulling capacity of 465,000 pounds. On the other hand, a similar sized standard derrick built of MAN-TEN steel also weighs 42,000 pounds but has a pulling capacity of 645,000 pounds. In addition, MAN-TEN steel's 40% higher fatigue strength materially prolongs life by providing added durability.

USS

UNITED STATES STEEL CORPORATION, PITTSBURGH · AMERICAN STEEL & WIRE DIVISION, CLEVELAND · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
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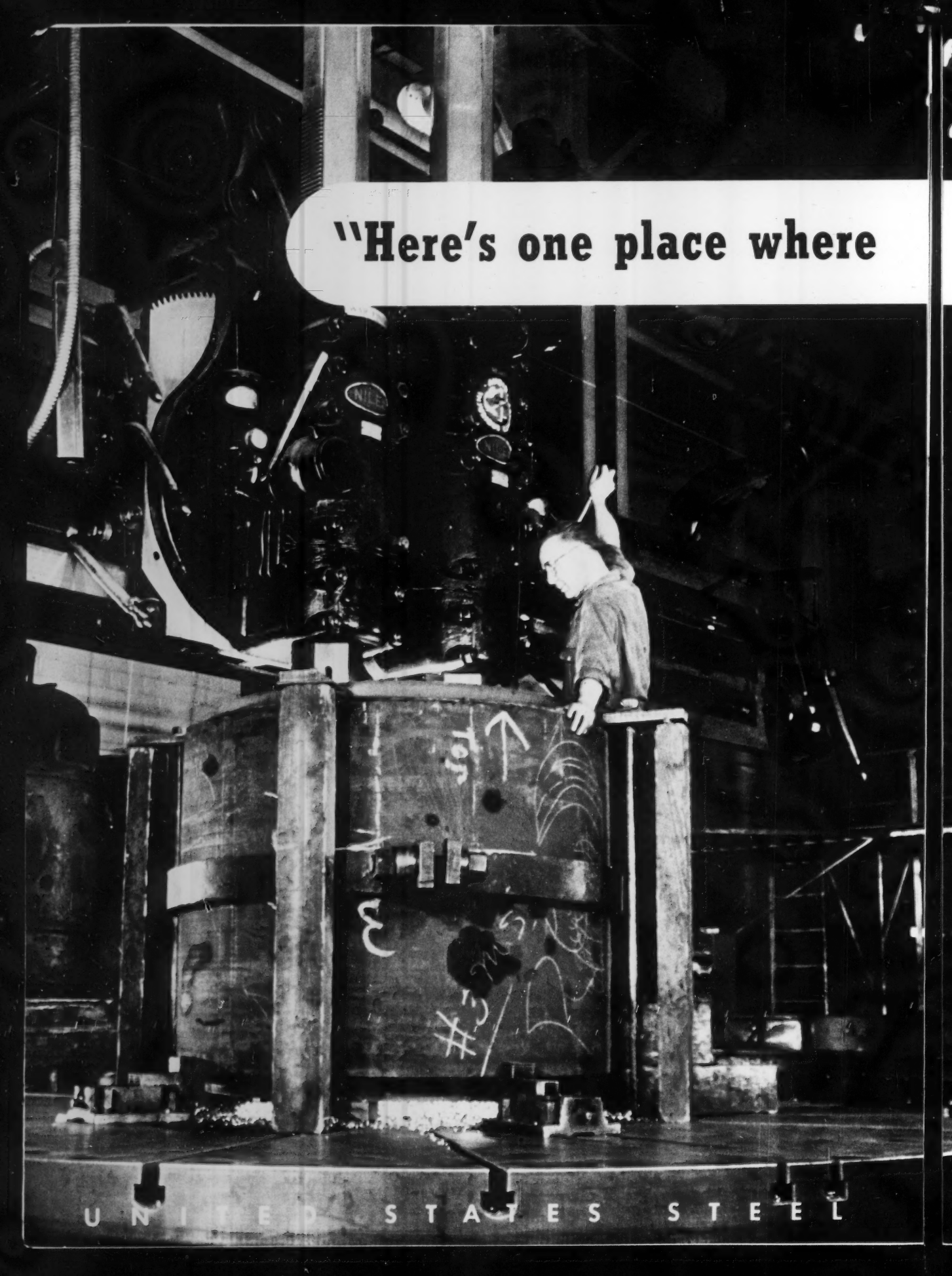
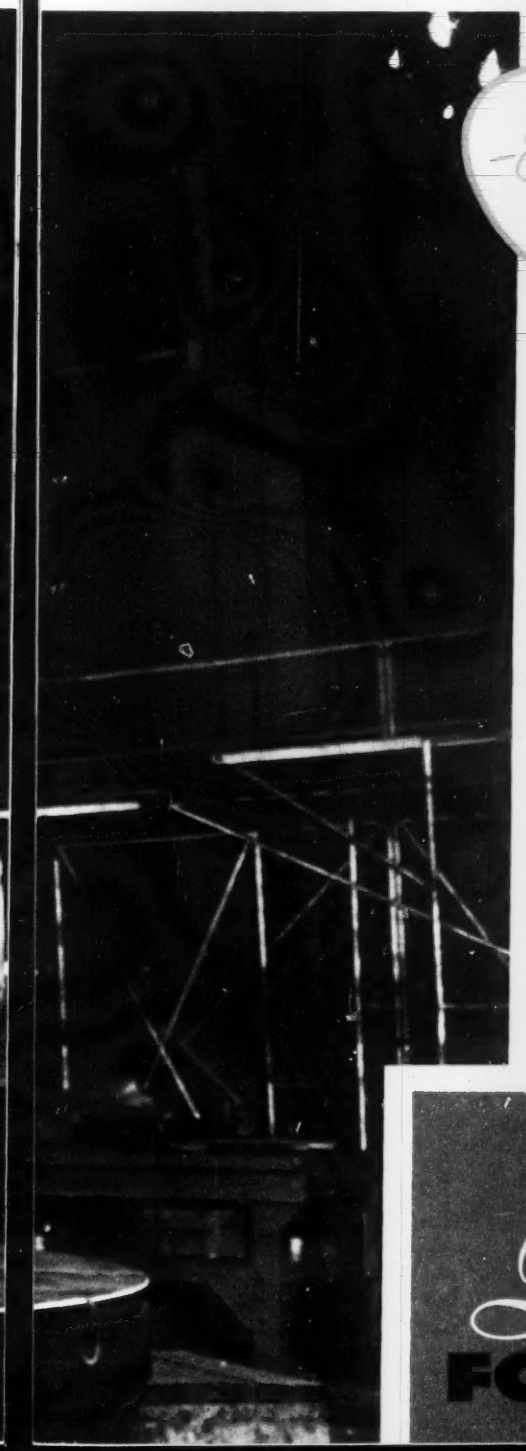
UNITED STATES STEEL


"Here's one place where
UNITED STATES STEEL

everything must be right"

—Says William J. Holohan
U.S. STEEL MACHINIST



HERE in the machine shop of our Homestead Forgings Division the stakes are high. The responsibility is enormous. For here, forgings of all types and sizes—generator shafts, back-up rolls, drop hammer columns, ship shafting, etc.—receive their final "rough" or "finish" machining.

This is the wind-up for all the work that has gone before—the heating, forging, heat treating, the hundreds or thousands of man-hours. The success of the entire job is now in the hands of the machinist. He has to be good.

That's why men like William Holohan are in charge of all machining operations in our Forgings Division.

Holohan has been a U. S. Steel Machinist for 41 years. As an expert on the 12-foot vertical boring mill, he is carrying on a family tradition of fine steel making—following in the footsteps of his father, who retired as a Foreman after half a century of service.

These are the men who make your U·S·S *Quality* Forgings—men, working with the most modern equipment, whose skill and experience are combined to give you always the finest forgings that money can buy.

Send for our free 32-page booklet describing U·S·S Quality Forgings. Write to United States Steel, 525 William Penn Place, Room 2816-I, Pittsburgh 30, Pa.

USS

Quality

FORGINGS

heavy machinery parts—carbon, alloy, stainless

electrical and water wheel shafts

hammer bases and columns

marine forgings

New facts for your file on U·S·S CARILLOY STEELS

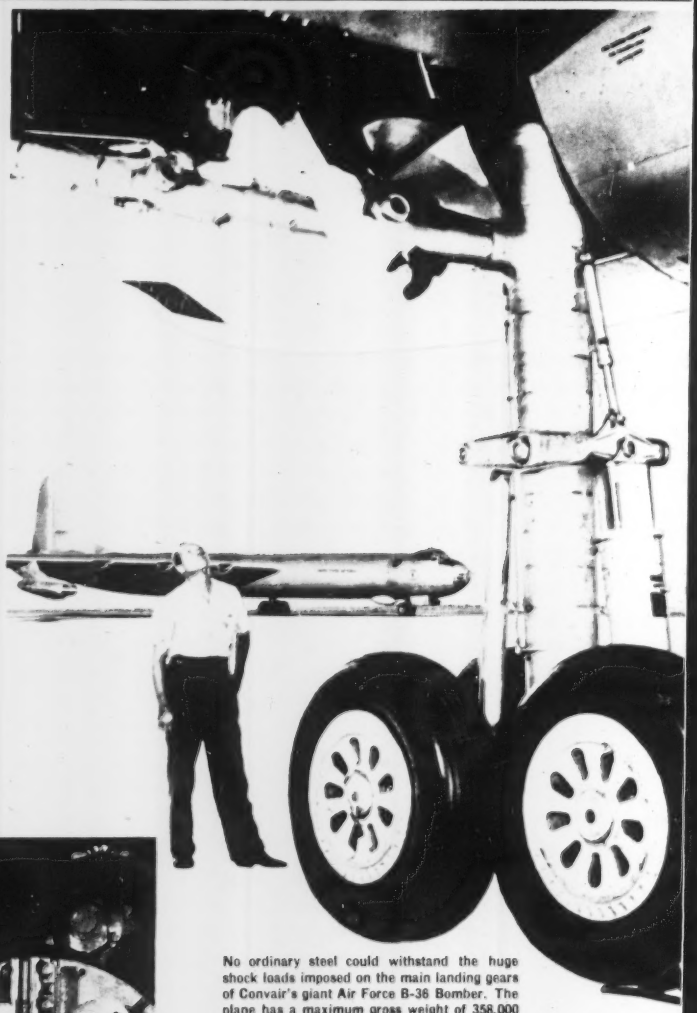
Every B-36 lands on U·S·S Carilloy steel

● When 179 tons of B-36 thump down on a landing strip, tremendous stresses are built up in the structural parts of the landing gear. Only the highest quality in steel can handle this tough job, which is one of the most exacting in the aircraft industry.

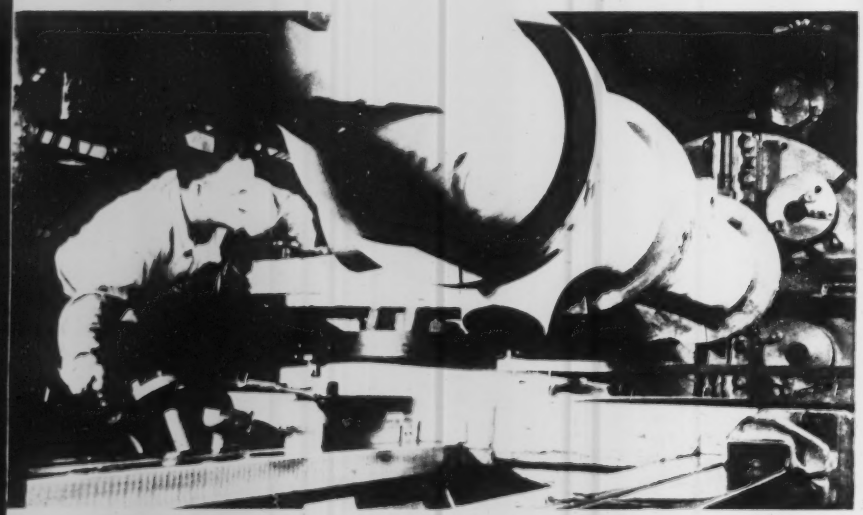
All of the rugged main columns for these landing gears are made from U·S·S CARILLOY electric-furnace aircraft quality ingots. This high quality alloy steel provides the great strength and shock resistance demanded in the performance of the finished part. The main columns for these landing gears are forged. The original ingot, as shipped to the forger, weighs approximately 37,500 lbs. From it are produced two columns, each weighing about 1200 lbs. In other words, approximately 93% of the steel has been removed—with a mere 7% of the original ingot left to do this tremendous job. Obviously, this steel must be of the very best quality.

The same care and skill go into every ton of CARILLOY steel that *you* buy, whether it's a giant alloy ingot or a few tons of special steel. Our experienced metallurgists keep a close check on *every* heat of steel to make sure it has the strength, hardness, toughness and machinability that's needed.

If you have a special steel problem, let us know. We'll be glad to help you with it.



No ordinary steel could withstand the huge shock loads imposed on the main landing gears of Convair's giant Air Force B-36 Bomber. The plane has a maximum gross weight of 358,000 lbs., with still higher landing shock loads. But U·S·S Carilloy steel has more than enough impact strength to hold up under this severe punishment.



U·S·S Carilloy electric-furnace aircraft quality steel meets every requirement for these vital parts. The precision machining and expert heat treatment they get at Cleveland Pneumatic Tool Company complete the job.

USS

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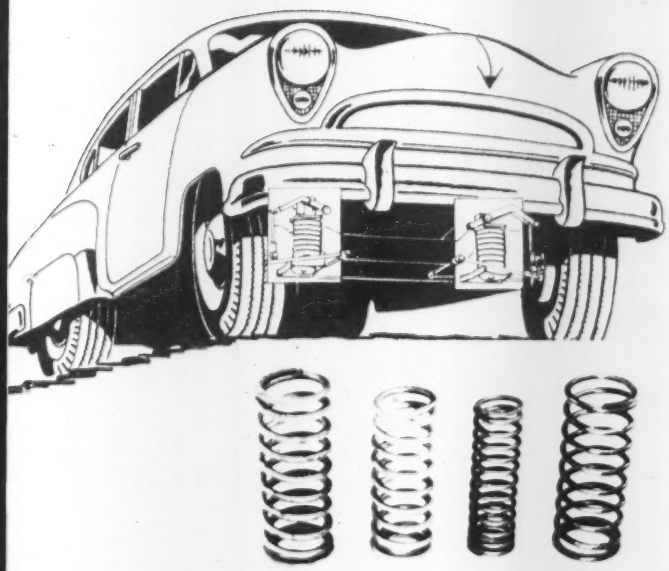
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. · UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

UNITED STATES STEEL

New facts for your file on U·S·S CARILLOY STEELS

HALF THE NEW CARS HAVE COIL SPRINGS MADE OF U·S·S CARILLOY PRECISION ROLLED COIL SPRING ROUNDS . . .

- they are twice as accurate as ordinary hot-rolled bars
- require little or no centerless grinding
- *and they cost less to use*



● In the early days of the development of coil springs for front suspensions of automobiles, the only steel that was available was an ordinary hot-rolled bar from which as much as .035" of metal per side had to be removed by grinding to insure freedom from harmful seams, pits, and decarburization. This cost money, was wasteful and time consuming.

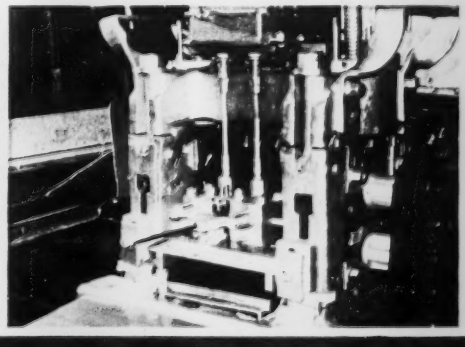
This seemed to be an expensive approach to a simple problem, so United States Steel equipped one of their mills to produce hot-rolled bars to eliminate harmful defects and most of the grinding expense. They devised a method for rolling a bar to half the standard tolerances, with half the amount or less of decarburization, which made it attractive to use the material "as furnished" or with a small amount of centerless grinding. We call this bar a Precision Rolled Coil Spring Round. It has performed excellently when used "as furnished" or with a small amount of grinding.

This exclusive development has paid off in two ways. It paid us because the CARILLOY Precision Rolled Coil Spring Round is now used in over half of the coil springs in new automobiles. But, most of all, it has paid off for the automobile manufacturer in that his costs are reduced with performance of the highest order. Today we are still hard at work developing new and better alloy steels for other new uses in automobiles; for example, in automatic transmissions, power steering units and other new and vital automobile parts.

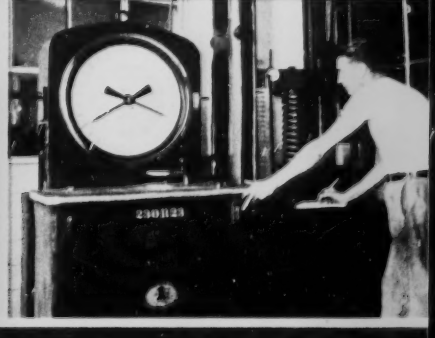
Our experienced engineers and metallurgists will be glad to consult with *you* on any steel or fabrication problem. Just write to United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

Here, at Muehlhausen Spring Division of Standard Steel Spring Co., precision rolled U·S·S CARILLOY Coil Spring Rounds are coiled without centerless grinding. CARILLOY Rounds have a guaranteed minimum decarburization, and they cost less to use.

At the Gary Works of United States Steel, this precision mill rolls CARILLOY Coil Spring Rounds with extreme accuracy. Tolerances are only half of standard; .004" on the diameter, instead of the usual .008", and only .006" out of round, compared to .012" on ordinary rolled bars.



Coil springs made of CARILLOY Precision Spring Rounds have been proved in severe laboratory tests, as well as in actual service on America's best automobiles. They perform so well that half of all automobile coil springs are now made of CARILLOY steel.



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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

UNITED STATES STEEL

New facts for your file on

U·S·S STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

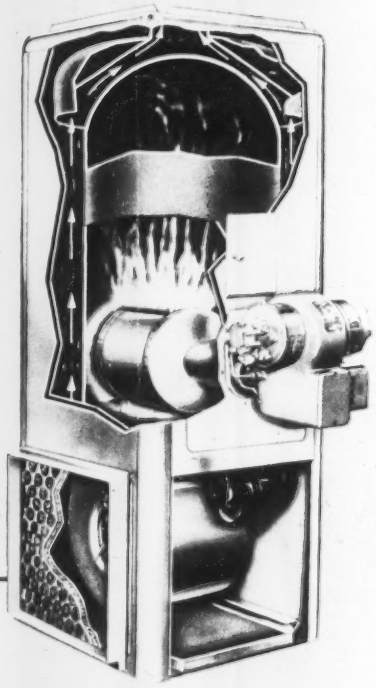
Type 442 Stainless Steel performs well in firebox of oil-fired domestic furnace

● A prominent manufacturer is currently using U·S·S 21 (Type 442) Stainless Steel for the firebox assembly of its oil-fired domestic furnace.

This oil-fired unit has a chamber, approximately 10 inches long and 12 inches in diameter, composed of a cylinder with an open top to which is spot welded a front cone and a rear cone. Operating temperature is 1600° to 1800°F.

When restrictions prevented the use of a nickel-bearing grade, this manufacturer turned to Type 442, a straight-chromium grade of Stainless Steel. Type 442 has performed satisfactorily from the fabricating standpoint. There has been no trouble in drawing and forming, and its oxidation resistance is considered equal or superior to the nickel-bearing grade previously used.

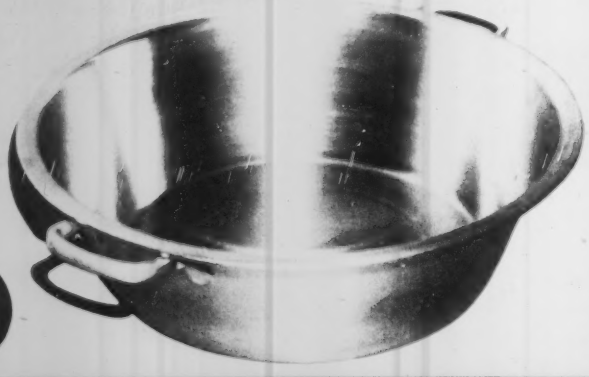
Stainless Steel sheets used are 20 gage.



CROSS-SECTIONAL VIEW of an oil-fired furnace with its firebox of Type 442 Stainless Steel.

20-quart dishpans deep drawn from Type 430 Stainless Steel

THIS 20-QUART dishpan shows the excellent drawing characteristics of Type 430 Stainless Steel. It was made by Peal Manufacturing Company, Cincinnati, Ohio.



● Twenty-five thousand of these 20-quart dishpans have been manufactured for the Army Quartermaster Corps by Peal Manufacturing Company, Cincinnati, Ohio, using Type 430 Stainless Steel.

The 19-gage sheets are ordered to $26\frac{3}{4}$" x $80\frac{1}{4}$", and are first sheared into a square and then into a circle. Two tapered-side draws form the pan, the end flange is folded in, the surface is ground, and handles of Type 430 Stainless Steel are welded to the pan.

Type 430 Stainless Steel has presented no problems in fabrication in this application.

HELPFUL SUGGESTIONS ON FABRICATION

Our book, "Fabrication of U·S·S Stainless and Heat-Resisting Steels," contains information that will be helpful to you, no matter what grade of Stainless Steel you are using. If you would like a copy, send your request to United States Steel Corporation, Room 2816-I, 525 William Penn Place, Pittsburgh 30, Pa.

USS

UNITED STATES STEEL CORPORATION, PITTSBURGH · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. · UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

UNITED STATES STEEL

The structural shop required a special crane

This 80-foot EDERER crane was "job-engineered" to the exact materials handling requirements of the structural shop in a large steel fabricating plant. One of the requirements was a 5-ton auxiliary hoist in addition to the 15-ton main hoist. As with all EDERER cranes, full welded girder construction, oversize parts, extra high safety factor all combine to make for maximum performance, minimum maintenance—economy all around.

EDERER—one of the largest crane manufacturers in the West—can "job-engineer" a crane to meet *your* particular requirements.

Write for Crane Bulletin CR-500

244C53

EDERER ENGINEERING COMPANY • 2935 First Avenue South • Seattle 4, Wash.

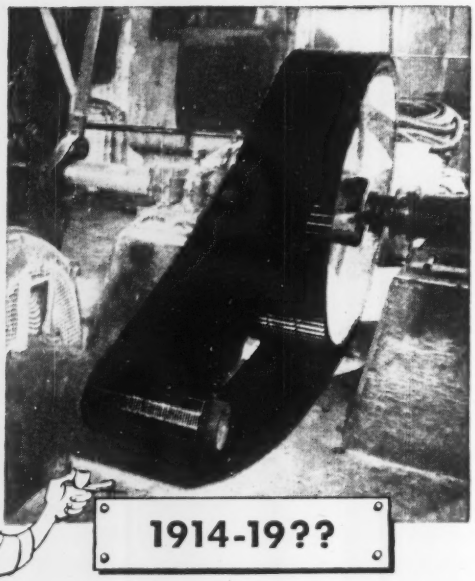
Export Division: 301 Clay Street, San Francisco 11, Calif.

EDERER

CRANES

OVER 50 YEARS "JOB-ENGINEERING" CRANES FOR INDUSTRY

Can you expect 38 years of service life from your silent chain drives?



Morse Silent Chain Drive on one of eight elevating legs. Drive is 12" wide x 1" pitch. This is one of eight Silent Chain Drives just replaced after 38 years of service.

Western Maryland Railway Company uses over three miles of belt conveyors in the big grain elevator shown below.

Sixty-five Morse Silent Chain Drives transmit power from motors of from 5 to 100 hp. to drive the belts which lift 15,000 bushels of wheat per hour or deliver 90,000 bushels per hour.

Long, long service life

Morse equipment was used in the original installation of the elevator over 38 years ago. The Morse Silent Chain Sprockets are still the original ones. So are the majority of the Morse Silent Chain Drives. The exceptions: The chain on the eight elevating legs and the chain on one of the long delivery belts were just replaced. Also, in 1922 an explosion wrecked a few drives, which were replaced and have been operating only 31 years.

See your Morse Distributor

Morse Silent Chain Drives are ruggedly built around the exclusive Morse Rocker Joint. They transmit power smoothly, noiselessly, with over 99% efficiency. Service life is unusually long and trouble free.

Do you want to reduce machine-down time? Want exceptional service life from your power transmission equipment? Want to reduce cost per hour of power transmission? Then see your local Morse Distributor about Morse Stock Silent Chain Drives —or Morse Roller Chain Drives, Morse Morflex Couplings, Morse Chain Couplings, and other Morse stock products. Look under "Chains" or "Power Transmission" in phone directory's yellow pages.

MORSE CHAIN COMPANY

Dept. 532 • 7601 Central Avenue • Detroit 10, Michigan

*

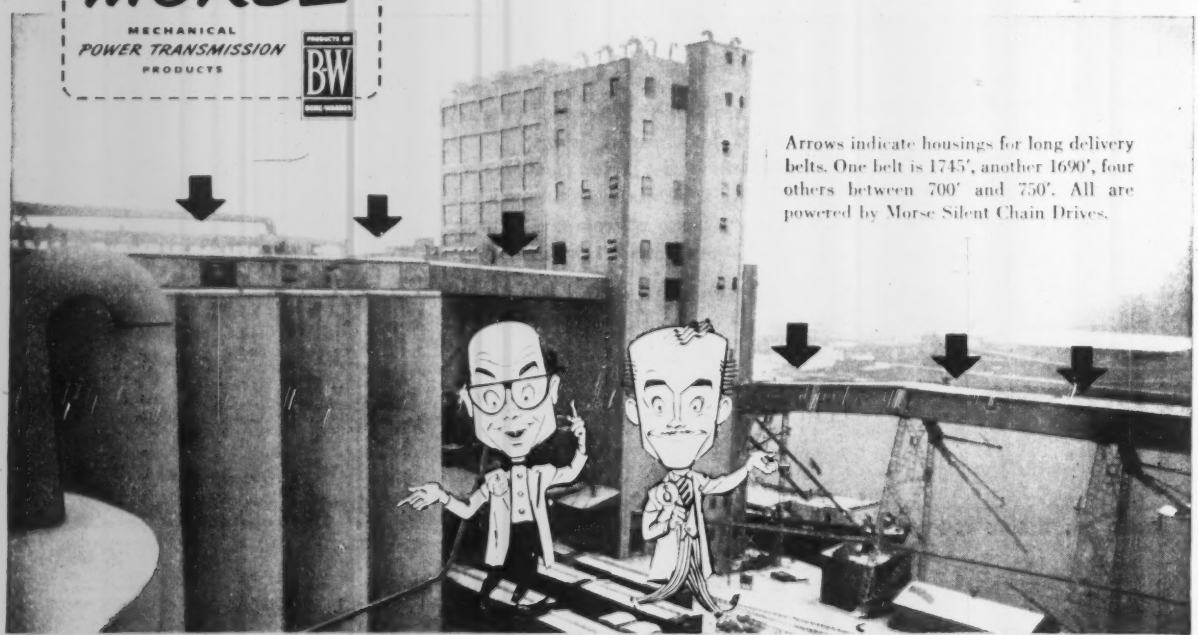
Long Service Life, Engineering Service, Quality which you get in unusual degree when you buy Morse Power Transmission Products.

MORSE

MECHANICAL POWER TRANSMISSION PRODUCTS

PRODUCTS OF BW

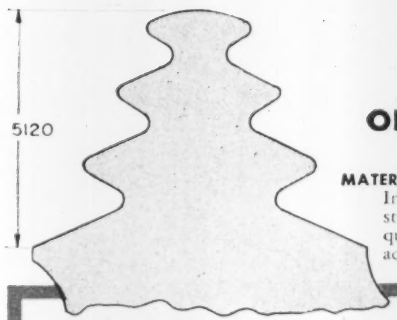
M=PT; Morse *means* Power Transmission



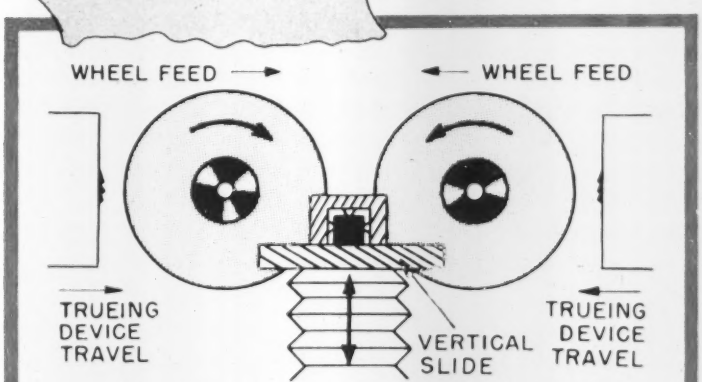
Arrows indicate housings for long delivery belts. One belt is 1745', another 1690', four others between 700' and 750'. All are powered by Morse Silent Chain Drives.

FORM GRINDING
JET ENGINE BUCKET ROOTS
FROM THE SOLID!

ON J & L DUAL-WHEEL AUTOMATIC FORM GRINDERS



MATERIAL BORDERS ON UNMACHINABLE Intense heat and great centrifugal stresses on the pressure surfaces require the toughest material and most accurate finish.



Bucket is mounted on a reciprocating vertical slide for two-way grinding.

AUTOMATICITY SPEEDS PRODUCTION — MAINTAINS REPETITIVE ACCURACY — Operation is simplified to the push button stage by a completely automatic work cycle.

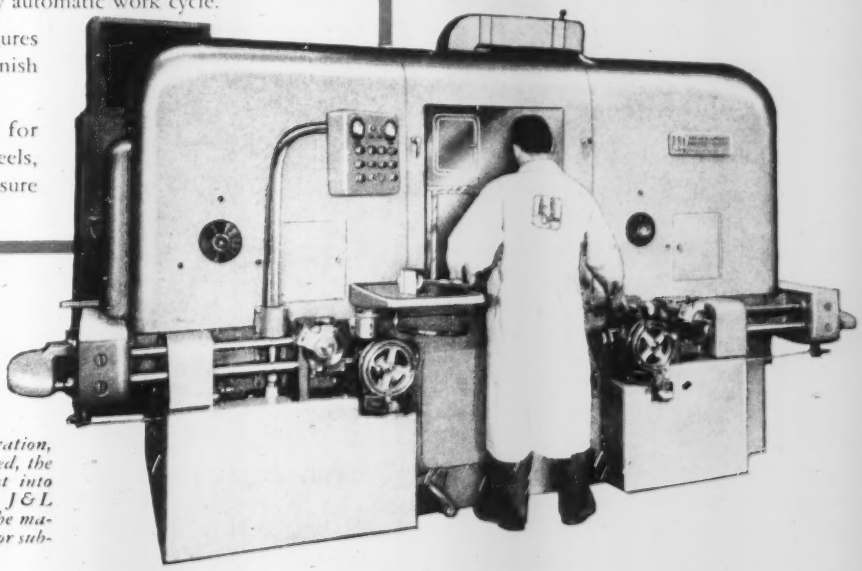
Automatic wheel trueing assures accuracy of form — includes finish trueing before final cut.

Automatic compensation for amount dressed off the wheels, and automatic wheel feed assure accurate sizing.

FEW MORE DIFFICULT GRINDING JOBS EXIST — Yet both sides of the root are ground simultaneously, to gage tolerances, on a production basis.

REPETITIVE ACCURACY MAINTAINED
Spacing of pressure surfaces within .0002
Taper within .0005
Angles within 10 minutes
Thickness from .0005 to .001

ACHIEVEMENT RESULT OF SEVERAL YEARS' RESEARCH AND EXPERIMENTATION — This application of the proven principles, long incorporated in J & L Thread Grinders, was initiated several years ago. The first machine was delivered in 1948. Continued study and subsequent refinements have helped lick one of the toughest machining problems of our day. Perhaps we can help you too.



P.S. ---> *Before the grinding operation, the foil contour is checked, the blade oriented and cast into a matrix, on a special J & L Optical Comparator. The matrix serves as a fixture for subsequent operations.*

JONES & LAMSON

Machine Tool Craftsmen Since 1835

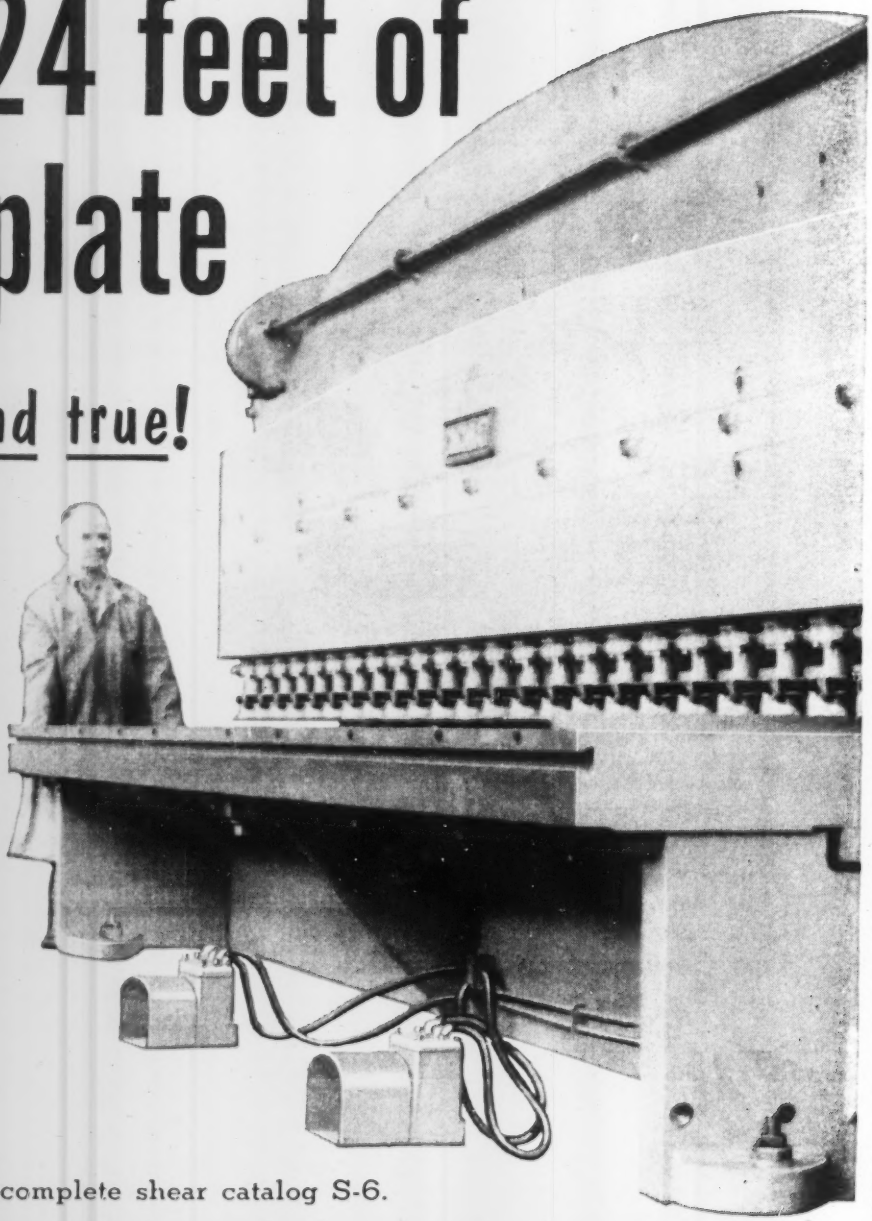
JONES & LAMSON MACHINE CO., 517 Clinton St., Dept. 710, Springfield, Vt., U.S.A.

THREAD GRINDER DIVISION

"CINCINNATI"

shears 24 feet of ¼ inch plate

...straight and true!



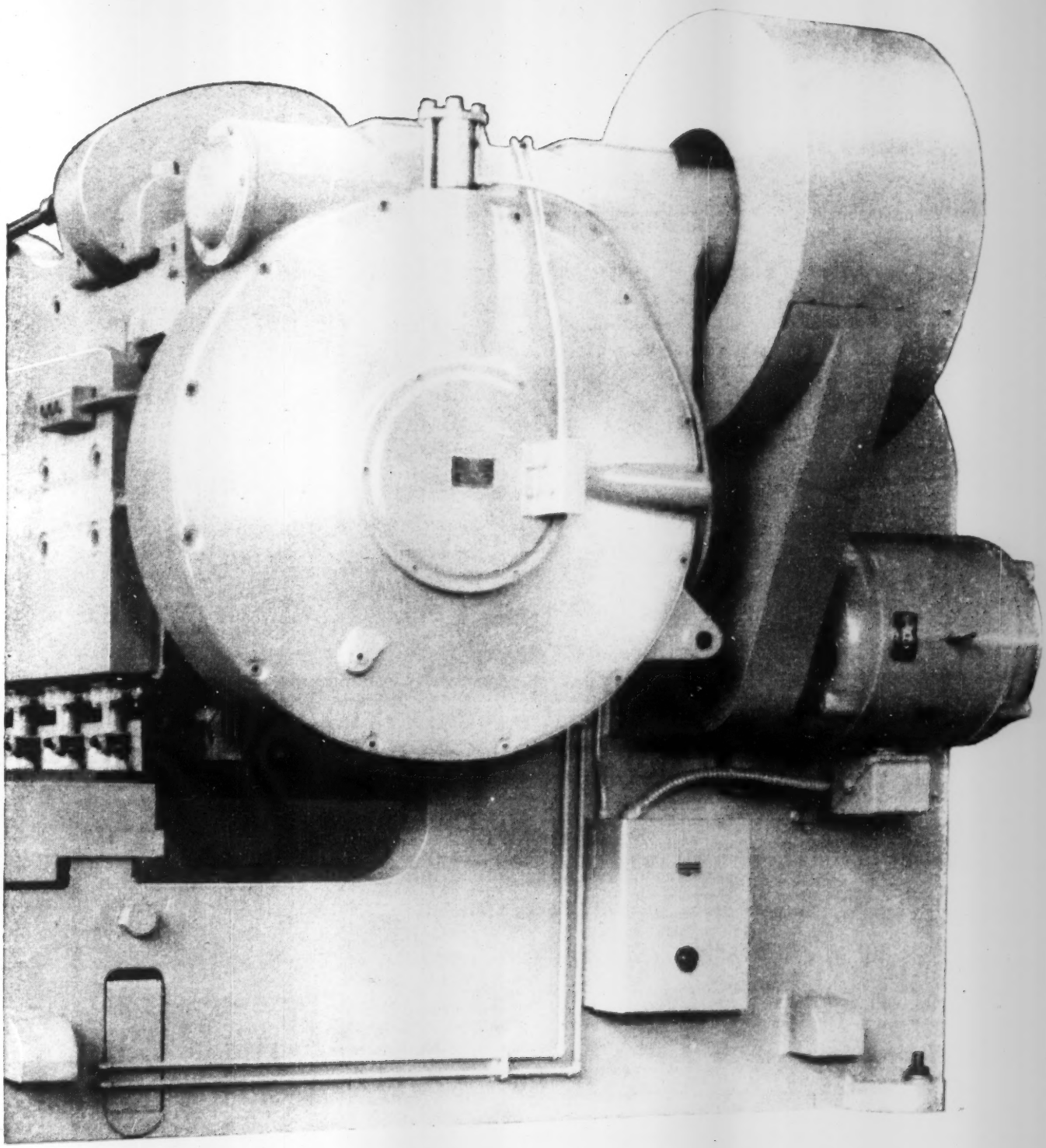
Cincinnati Shears, built with machine tool accuracy and exceptional rigidity, cut to close tolerances even on the longest cuts.

Built in lengths from 4 ft. to 24 ft., they shear .005" thick sheets to 1 ¼ in. plate with micrometer accuracy. They handle a wide variety of materials ranging from soft aluminum to armor plate.

Write for complete shear catalog S-6.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES



■ Cincinnati 10024 Series Shear capacity ¼ in. mild steel 24 ft. long.

"PYRODISC"

ONLY $25!*

the new *LINDBERG* HOT PLATE

At last! A quality, portable hot plate . . the Lindberg Pyrodisc!

It's built with the "occasional user" in mind. There's no point in buying the extra capacity of a larger hot plate if you don't need it. If your volume of "hot plate" work is limited, the Lindberg Pyrodisc is just what you want . . and its selling price is only $25.

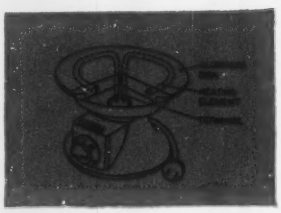
These design, construction, and operating features make the Lindberg Pyrodisc Hot Plate an exceptional buy!

- Cast-in elements.
- "Stepless" control permits extremely precise control of temperatures.
- Terminals are protected from spillage and short circuits.
- Streamlined appearance . . it's not just a good piece of equipment . . it looks good, too!

Diameter, top plate and base 8" • Power rating, 660 watts • Power service, 115 volts, 50/60 cycle • Includes cord and plug for easy installation • Approximate shipping weight, 10 lbs.

For additional information, ask for bulletin No. 1030

*Price subject to change without notice.



Sheathed Nichrome heating elements are cast into aluminum top plate . . insuring quicker heating (750° F in 35 minutes), good uniformity, and exceptionally long element life.

SOLD ONLY THROUGH LABORATORY SUPPLY DEALERS

LINDBERG LABORATORY EQUIPMENT

Laboratory Division, Lindberg Engineering Company, 2441 West Hubbard Street, Chicago 12, Illinois

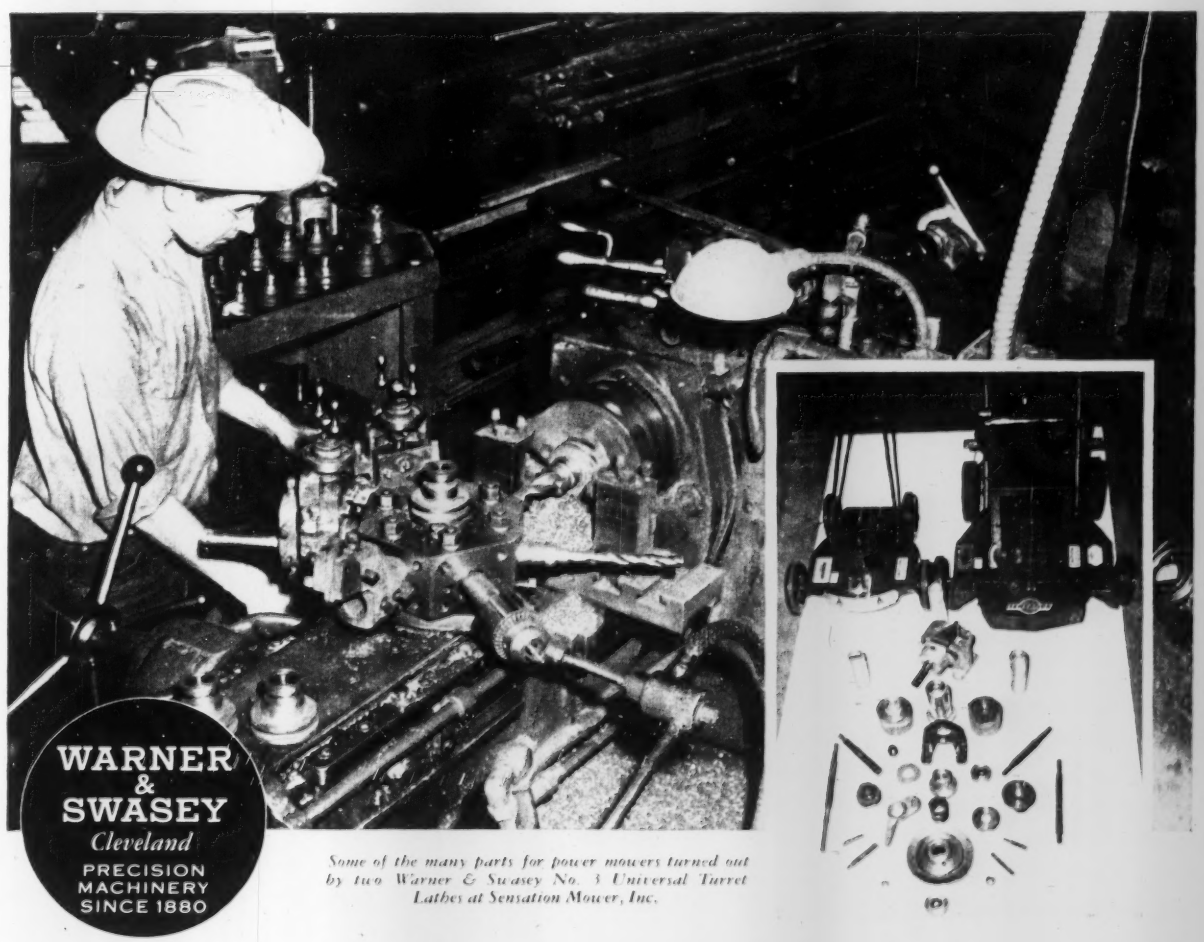
For Big Business–SURE
...and Small Business, too!

SENSATION MOWER, INC., Ralston, Neb., is not a high production shop in terms of metalworking plants. But this relatively young company, using only two Warner & Swasey No. 3 Universal Turret Lathes for their entire metal turning needs, was able to compete effectively and grow in the power lawn mower field.

The two Warner & Swaseys give Sensation Mower the versatility they need to produce over 40 different parts for mowers. They also turn out parts for newer lines of snow removal equipment and power floor polishers. The Warner & Swaseys' versatility has even enabled the company to take on sub-contract work during their "off-season".

Both machines have had a total of *only one day's downtime* since their installation in 1946!

You can count on this kind of highly versatile, dependable production with Warner & Swasey Turret Lathes—money-makers whether you're a small manufacturer or in business in a "big" way!



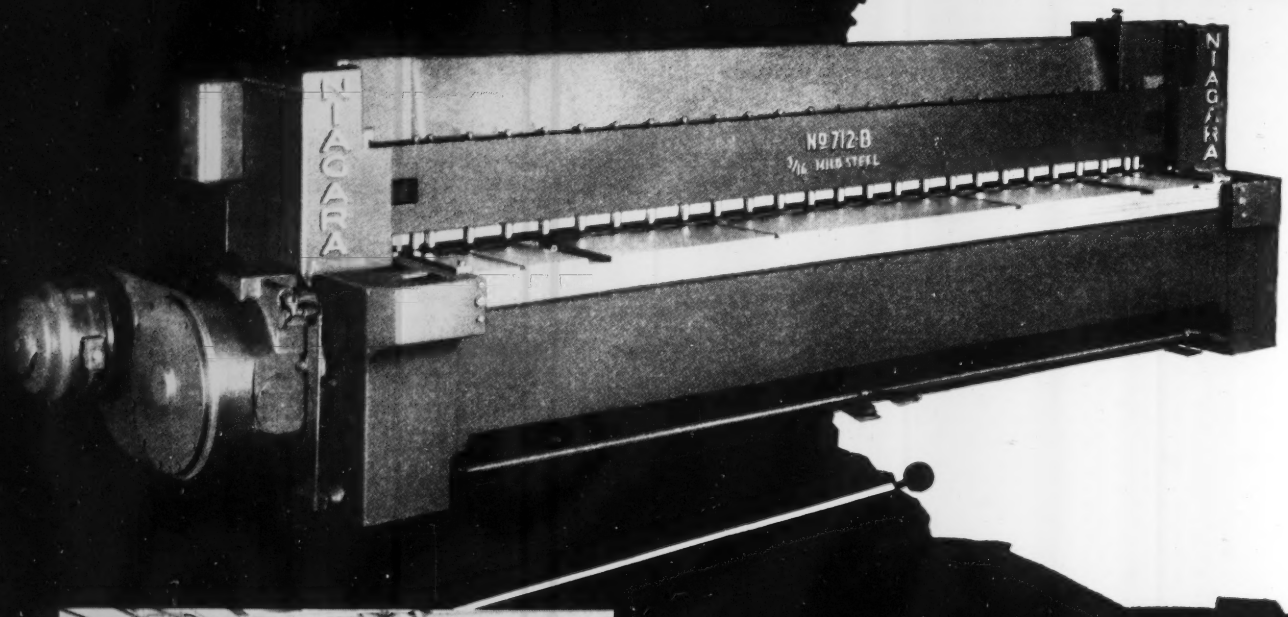
Some of the many parts for power mowers turned out by two Warner & Swasey No. 3 Universal Turret Lathes at Sensation Mower, Inc.

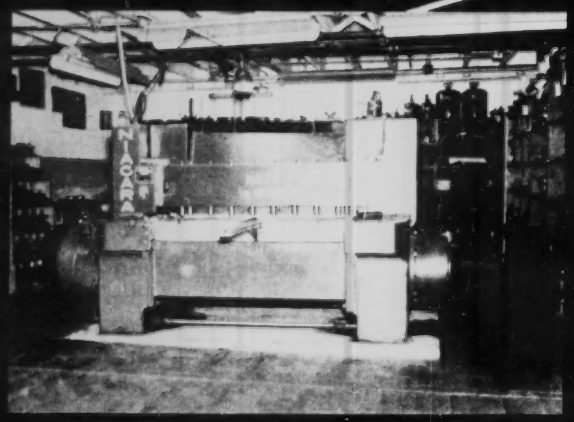
WARNER & SWASEY
Cleveland
PRECISION MACHINERY SINCE 1880

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY MACHINE TOOLS, TEXTILE MACHINERY, CONSTRUCTION MACHINERY

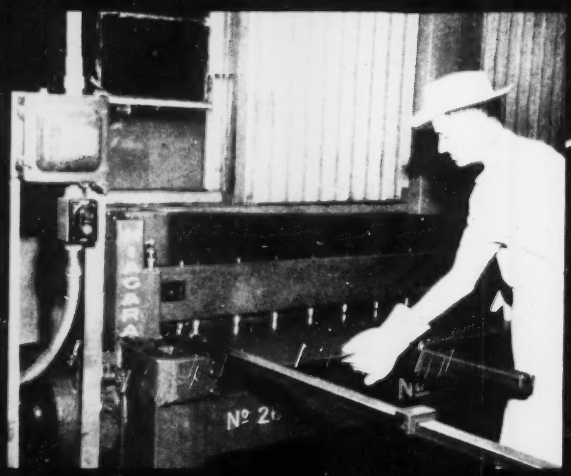
NIAGARA

SERVE INDUSTRY FROM





ELECTRONICS. Cutting .003" molybdenum to within .001" and ¼" copper with no change in set-up at a plant in California



DRUMS. Shearing sheets for drum bodies in Texas

NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y.

SHEARS
COAST TO COAST

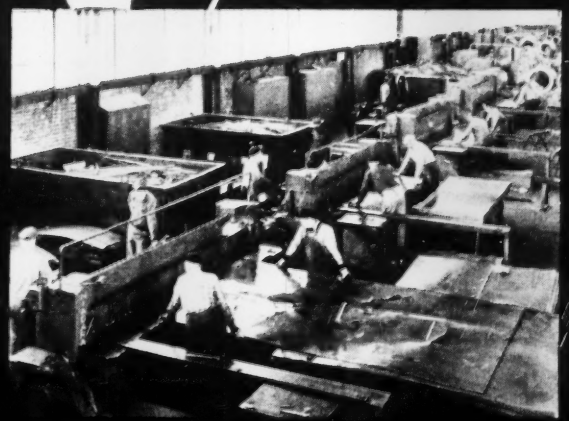
✱ For high volume shearing applications, Niagara shears are preferred because of their:

DEPENDABILITY
ACCURACY
LOW MAINTENANCE COST

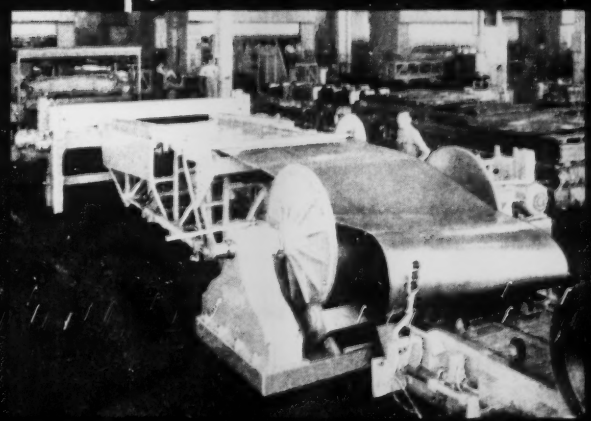
A few typical installations are illustrated

Niagara builds more than 80 different sizes and capacities of squaring shears . . . one to suit every requirement of production, maintenance or warehousing.

ELEVATORS. Two of seven Niagara Shears in production at a large plant in New Jersey



WAREHOUSE. Shearing thousands of tons of all kinds of steel at a steel warehouse in Michigan



AUTOMOBILES. Continuous operation in a cut off line at a body plant in Western New York

America's Most Complete Line of Presses, Shears, Machines and Tools for Sheet Metal Work

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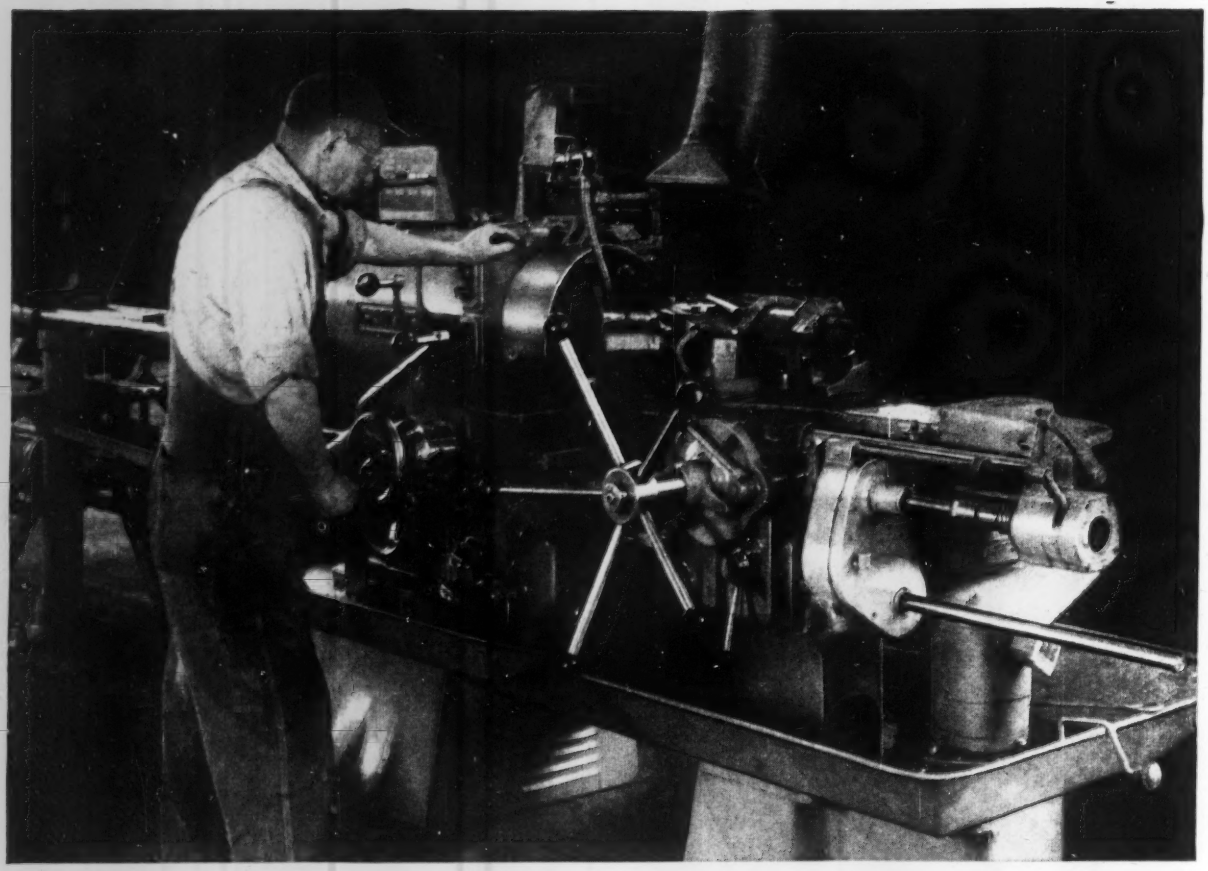
Dealers in principal U. S. cities and major foreign countries



MACHINING FOR GOLD at Homestake

with Gisholt Turret Lathes

Yes, gold mining means machinery. And here at the famous Homestake Mine at Lead, South Dakota, Gisholt Turret Lathes help to machine the machines that dig for gold. It's a big job, too—turning out the variety of rock bits and drill rods that are used up in large numbers.

This Gisholt Ram Type Lathe was first used to turn the plain ends on the one-inch quarter-octagon drill steel for two types of rock bits. Production averaged 30 an hour. Now, the machine is also used to machine and thread three sizes of forged steel drill rods. Besides all this, the Gisholt has the job of facing and chamfering the chuck, or shank ends, of the drill steel so that a perfectly flat face is hit by the drill machine tappet.

Here, again, Gisholt Ram Type Turret Lathes prove their easy change-over and ability to produce profitably, even on small runs—big assets in any machine shop. Ask your nearest Gisholt representative about them. Or write us.

GISHOLT MACHINE COMPANY

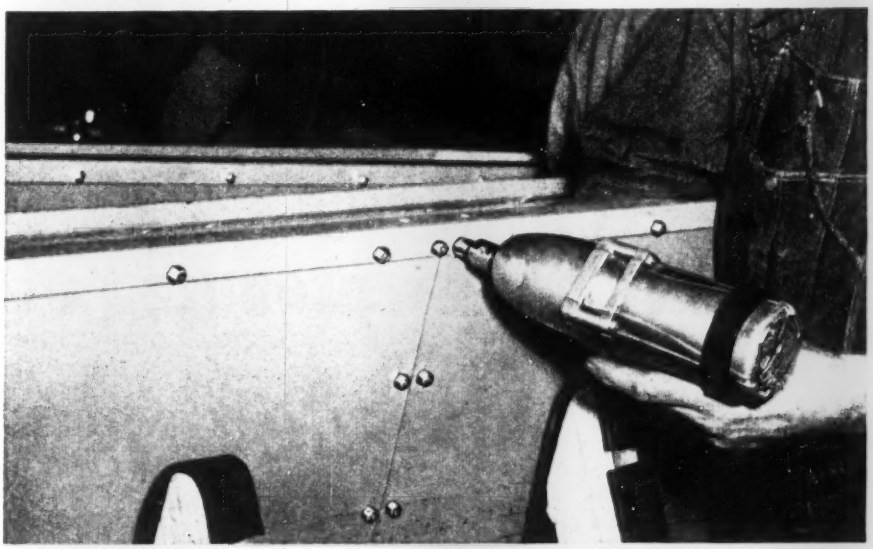
Madison 10, Wisconsin

THE GISHOLT ROUND TABLE

represents the collective experience of specialists in machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

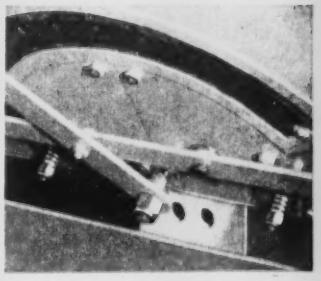
To cut assembly time



The one-piece, self-locking ELASTIC STOP nut is installed in seconds with an electric torque wrench. It will lock in any desired position on a bolt or stud—without extra parts or extra operations. Integral locking collars of nylon or fiber permit multiple re-use and re-setting.

and maintain adjustments

This Master Control mechanism on the Century Seeder must maintain a precise adjustment under conditions of severe vibration, in order to give a uniform seeding rate. ELASTIC STOP nuts maintain this accurate adjustment in spite of vibration, impact or stress reversal.



Century Engineering Corporation uses

Elastic Stop® **nuts**

H. H. McLeland, Chief Engineer for the Farm Equipment Division of the Century Engineering Corporation says:

"We specified Elastic Stop nuts on our new Century Seeder for all critical points because they withstood hundreds of hours of testing without losing their adjustment under vibration. They did not damage the bolt or stud threads, and could be re-set many times.

"We specified the same nuts for non-critical points because they facilitated rapid assembly with an electric torque wrench, and eliminated a lock washer. These features saved many hours of assembly time per day."

ESNA

ROLLPIN

ELASTIC STOP NUT CORPORATION OF AMERICA

Mail coupon for design information

Dept. N43-960, Elastic Stop Nut Corporation of America
2330 Vauxhall Road, Union, N. J.

Please send the following free fastening information:

- ☐ Elastic Stop nut bulletin
- ☐ Pointers on how to use them
- ☐ Here is a drawing of our product. What fastener would you suggest?

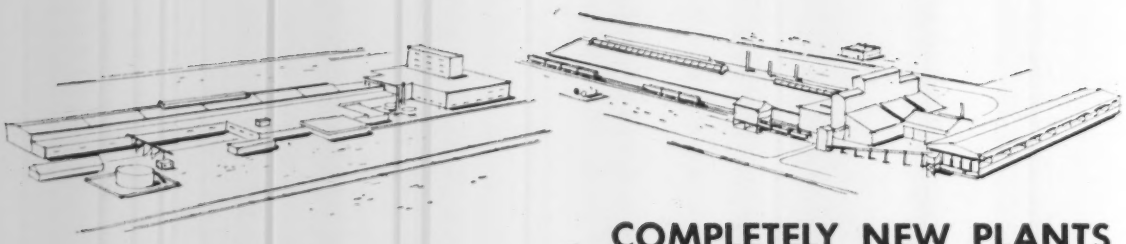
Name _____ Title _____

Firm _____

Street _____

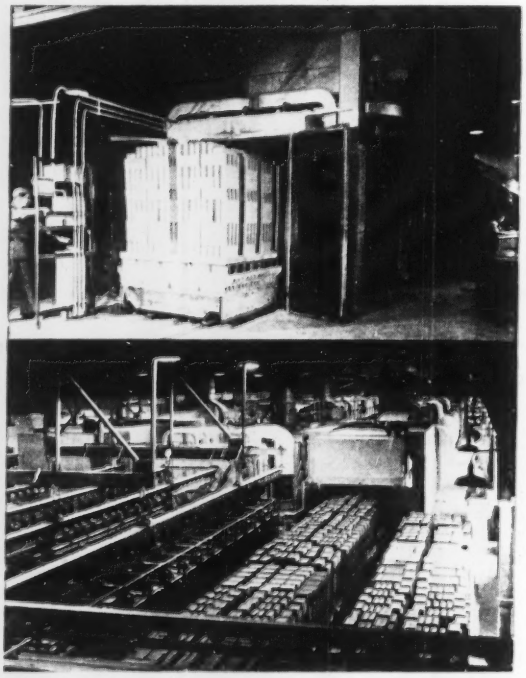
City _____ Zone _____ State _____

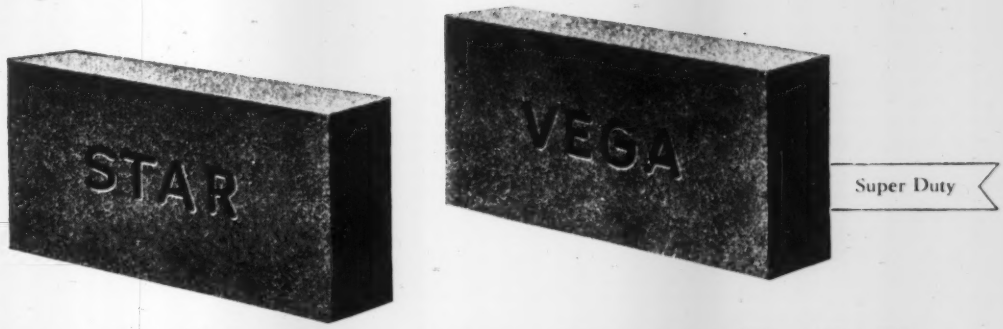
HARBISON-WALKER
the world's largest producer of



COMPLETELY NEW PLANTS
AND EXPANDED FACILITIES IN OTHER PLANTS
ADD TO HARBISON-WALKER'S SILICA BRICK CAPACITY

Silica refractories are made in Harbison-Walker plants in Pennsylvania, Ohio, Alabama, Indiana, Texas and California. The illustrations show the modern tunnel kilns in which STAR and VEGA are fired. Throughout all mining, processing, forming, drying and firing operations, modern methods and equipment are used to insure the uniformity and high quality of Harbison-Walker silica refractories.





SILICA BRICK

meets the greater demand with increased production facilities!

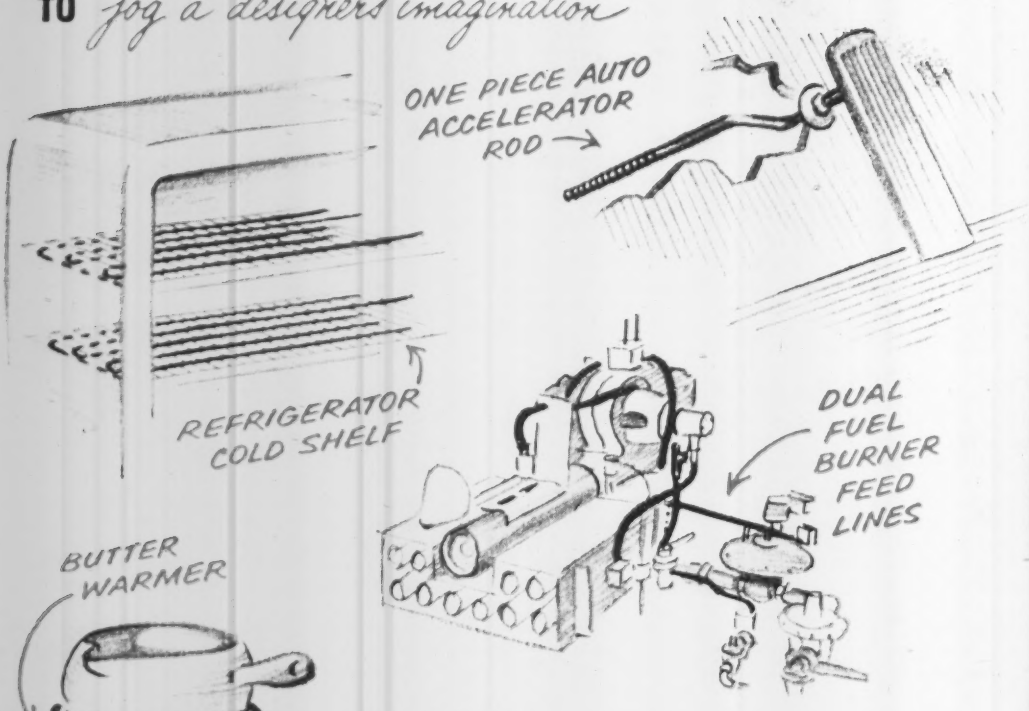
Over the years, the use of Harbison-Walker STAR and VEGA brands has steadily increased. For more than half a century, STAR has been the standard of quality for silica refractories. Continued research, developments in every step of the manufacturing procedures and close laboratory control, all contribute to the uniform high quality of STAR and VEGA.

VEGA brand, the original super-duty silica brick, first introduced over a decade ago was developed to meet the need for a silica refractory which provides the margin of refractoriness for the operation of furnaces at higher temperatures. Used under normal operating conditions, VEGA gives longer life and reduces maintenance costs.

Harbison-Walker continues its leadership of the progress in the production of silica refractories. To meet the greater demand for STAR and VEGA, Harbison-Walker has recently completed an extensive expansion program which has greatly added to the capacity for producing these refractories.

HARBISON-WALKER REFRACTORIES COMPANY
AND SUBSIDIARIES
World's Largest Producer of Refractories
General Offices: Pittsburgh 22, Pennsylvania

FROM *the Bundy Sketchbook*
TO *jog a designer's imagination*



REMARKS Give your ideas a cost-saving twist -- with Bundyweld Tubing. The very standard of dependability, it's helped beat many design, fabrication problems. Add: Bundy's unmatched fabricating, specialized engineering.

WRITE today for Bundyweld catalog or for help in developing your tubing application ideas.

BUNDY TUBING COMPANY, DETROIT 14, MICH.

Bundyweld Tubing

® DOUBLE-WALLED FROM A SINGLE STRIP

Leakproof	Lightweight
High thermal conductivity	Machines easily
High bursting point	Takes plastic coating
High endurance limit	Scale-free
Extra-strong	Bright and clean
Shock-resistant	No inside bead
Ductile	Uniform I.D., O.D.

WHY BUNDYWELD IS BETTER TUBING

Bundyweld starts as a single strip of copper coated steel. Then it's continuously rolled twice around, later-ally into a tube of uniform thickness, and passed through a furnace. Copper coating fuses with steel. Result: Bundyweld, double-walled and brazed through 360° of wall contact.

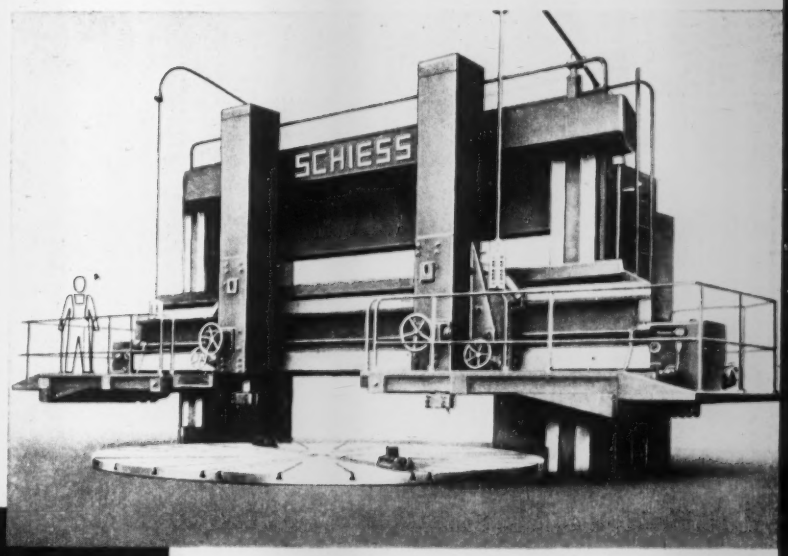
NOTE the exclusive patented Bundyweld beveled edges, which afford a smoother joint, absence of bead and less chance for any leakage.

Bundy Tubing Distributors and Representatives: *Cambridge 42, Mass.*: Austin-Hastings Co., Inc., 226 Binney St. • *Chattanooga 2, Tenn.*: Peirson-Deakins Co., 823-824 Chattanooga Bank Bldg. • *Chicago 32, Ill.*: Lapham-Hickey Co., 3333 W. 47th Place • *Elizabeth, New Jersey*: A. B. Murray Co., Inc., Post Office Box 476 • *Philadelphia 3, Penn.*: Rutan & Co., 1717 Sansom St. • *San Francisco 10, Calif.*: Pacific Metals Co., Ltd., 3100 19th St. • *Seattle 4, Wash.*: Eagle Metals Co., 4755 First Ave. South • *Toronto 5, Ontario, Canada*: Alloy Metal Sales, Ltd., 181 Fleet St., E. • **Bundyweld nickel and Monel tubing is sold by distributors of nickel and nickel alloys in principal cities.**

See SCHIESS equipment on display at
AMERICAN SCHIESS SERVICE CENTER
38th Street & AVRR • Pittsburgh, Pa.

By combining basic Schiess elements, extra heavy machines that would normally be considered special tools, can be built to your work diameter and load requirements.

The equipment shown here is typical of unusually large boring mills of latest Schiess design which, like the smaller models, incorporate new operating features listed below.



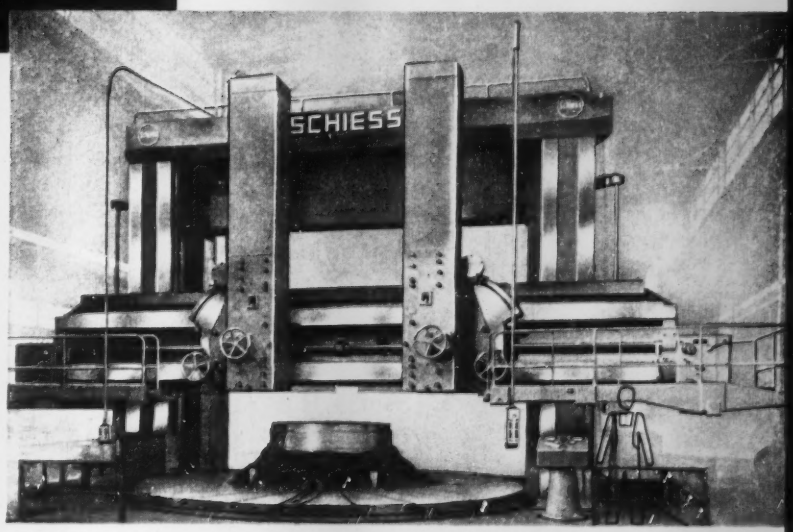
Model 3K Vertical Boring Mill
with 15 ft. turning diameter

NEWLY DESIGNED

HUGE VERTICAL BORING & TURNING MILLS *like these* -

Built from basic Schiess designs to any diameter from 10 ft. to 84 ft.

Model 5K Vertical Boring Mill
with 22 ft. turning diameter



Fingertip Speed Control

Counterbalanced cross rail and side head

Octagon rams which can be swiveled, completely enclosed

Pendant Control

Automatic Lubrication

Vertical Boring Mills of this type can be equipped with inner and outer tables—and with 1 or 2 operator control panels.

Engineering Division

AMERICAN
SCHIESS
CORPORATION

38th Street and AVRR, Pittsburgh, Pennsylvania

Sole Distributor

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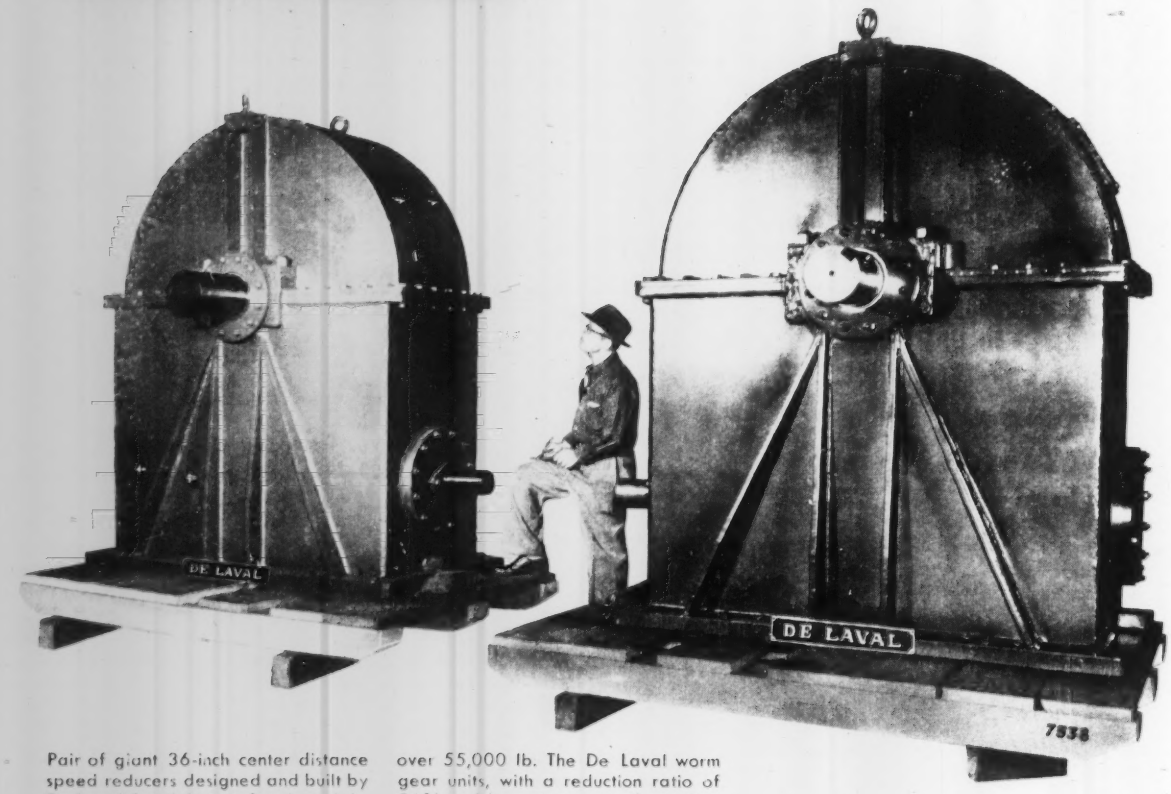
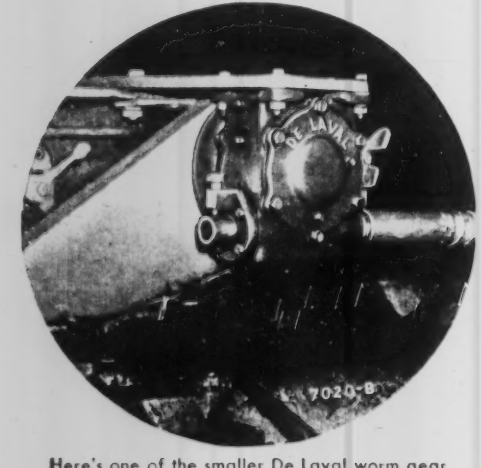
DE LAVAL
SPEED REDUCERS

from dwarf to giant size



Pair of giant 36-inch center distance speed reducers designed and built by De Laval for slab transfers in a slabbing-blooming mill. These slab transfers are used to convey steel slabs up to 12 in. thick and 42 in. wide, weighing over 55,000 lb. The De Laval worm gear units, with a reduction ratio of 26⅔ to 1 in a single set of gearing, are each driven by a 200 hp, 410 rpm motor coupled directly to the input shafts of the slab transfers.



Here's one of the smaller De Laval worm gear speed reducers with a 3" center distance being used for a new coal drilling machine.

De Laval heavy-duty worm gear speed reducers seldom require attention under the most rugged operating conditions. They make a quiet, close-couple compact drive. They permit high ratio reductions in a minimum of space and withstand severe shock loads without damage. De Laval builds all sizes from 3" to 36" center distances for transmission ratios of 3.1:1 to 100:1 in single reduction units and ratios of 50:1 to 8000:1 in double reduction units. Whether you need dwarf or giant worm gearing, consult De Laval for engineering assistance. *Send for De Laval Manuals G-W BI and G-W W H containing data on single and double reduction units.*

DE LAVAL *Speed Reducers*

DE LAVAL STEAM TURBINE COMPANY
860 Nottingham Way, Trenton 2, New Jersey DL210

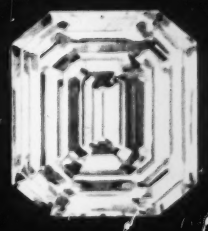
Here is perfection!

ROEBLING high carbon wire is unsurpassed for industry today. Roebling wire is absolutely true to specifications ... absolutely uniform in gauge and finish. Manufacturers who try Roebling wire once, become Roebling customers from then on.

You *pay* for the best when you buy high carbon wire. Make sure that you *get* it! Always specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

ROEBLING [CF]

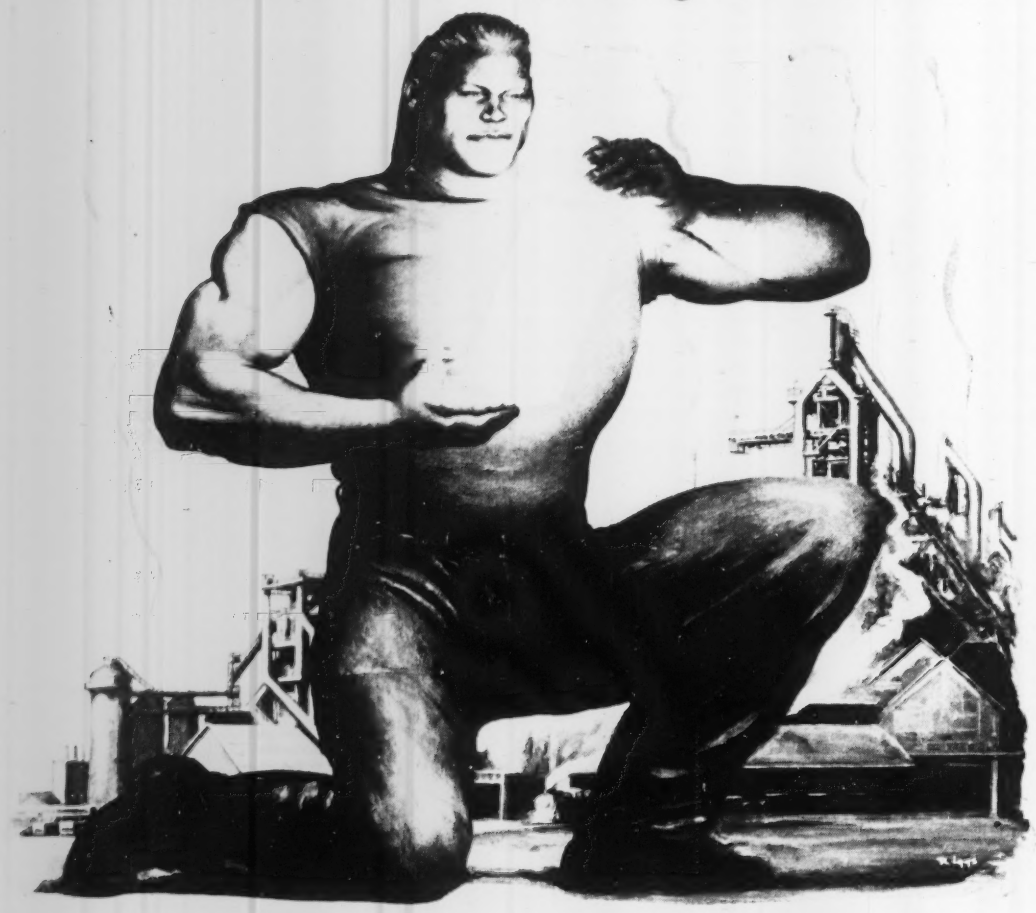
A subsidiary of The Colorado Fuel and Iron Corporation



The Jonker, world's largest emerald-cut diamond.

BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 1253 EMEDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, N. J.

Gives white hot steel the "kid glove" treatment



GIGANTIC MACHINES with thousands of moving parts are used to shape white hot ingots into plates and sheets. All of these hard-working machine parts are subject to intense heat . . . normal in steel manufacturing. Because of the intense heat, lubrication is a serious problem.

U. S. Steel has tried various types of greases in order to eliminate the problem of oil burn-out. Now they're using a product of Shell Research, Shell Alvania Grease. Result: better lubricating action *at once*. Months after the original installations, rollers were removed and an excellent film of grease was still present.

At the other extreme, zero weather caused grease in an automatic lubricating system to congeal and become unpumpable. Shell Alvania was tried and clogging promptly stopped. This multi-purpose grease is now used extensively in low-temperature operations at U. S. Steel's Ohio Plant.

SHELL ALVANIA GREASE

- **resists oxidation**
- **will not squeeze out**
- **extends periods between overhauls**
- **provides exceptional lubrication in high or low operating temperatures.**

Shell Alvania Grease can cut down costly maintenance and save time and money in *your* plant. Write for technical information.

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REX High Speed Steels are readily available in all parts of the country... through the widest distribution system maintained for tool and other special purpose steels. For uniformity and dependable delivery, call your nearest Crucible warehouse.

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WRITE TODAY for the unique Crucible Tool Steel Selector, 9" diameter, in 3 colors — a twist of the dial tells you which tool steel is best for your application. Address your request to Crucible Steel Company of America, Dept. S, Oliver Building, Pittsburgh 22, Pa.

CRUCIBLE first name in special purpose steels

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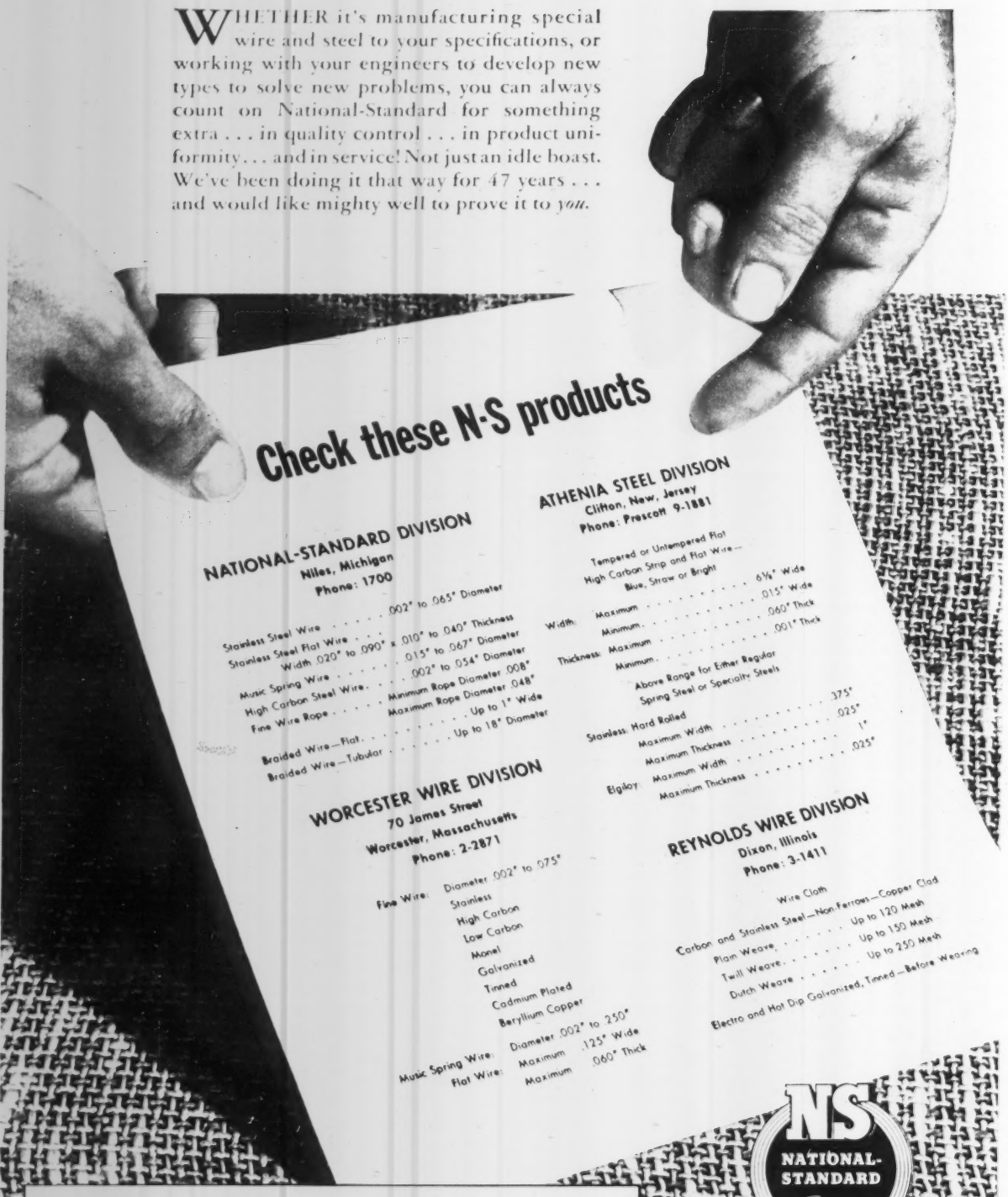
Need special-purpose wire or steel?

WHETHER it's manufacturing special wire and steel to your specifications, or working with your engineers to develop new types to solve new problems, you can always count on National-Standard for something extra . . . in quality control . . . in product uniformity . . . and in service! Not just an idle boast. We've been doing it that way for 47 years . . . and would like mighty well to prove it to *you*.



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Stainless Steel Wire . . . . . .002" to .065" Diameter
Stainless Steel Flat Wire . . . .
Width .020" to .090" x .010" to .040" Thickness
Music Spring Wire . . . . . .015" to .067" Diameter
High Carbon Steel Wire. . . . . .002" to .054" Diameter
Fine Wire Rope . . . . . Minimum Rope Diameter .008"
Maximum Rope Diameter .048"
Braided Wire—Flat. . . . . Up to 1" Wide
Braided Wire—Tubular . . . . . Up to 18" Diameter

ATHENIA STEEL DIVISION
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Tempered or Untempered Flat High Carbon Strip and Flat Wire—Blue, Straw or Bright

Width: Maximum . . . . . 6½" Wide
Minimum . . . . . .015" Wide
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Minimum . . . . . .001" Thick

Above Range for Either Regular Spring Steel or Specialty Steels

Stainless: Hard Rolled
Maximum Width . . . . . .375"
Maximum Thickness . . . . . .025"
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Maximum Thickness . . . . . .025"

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Fine Wire: Diameter .002" to .075"
Stainless
High Carbon
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Galvanized
Tinned
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Music Spring Wire: Diameter .002" to .250"
Flat Wire: Maximum .125" Wide
Maximum .060" Thick

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Wire Cloth
Carbon and Stainless Steel—Non Ferrous—Copper Clad
Plain Weave. . . . . Up to 120 Mesh
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Dutch Weave . . . . . Up to 250 Mesh
Electro and Hot Dip Galvanized, Tinned—Before Weaving

ATHENIA STEEL	*Clifton, N. J.*	Flat, High Carbon, Cold Rolled Spring Steel
NATIONAL STANDARD	*Niles, Mich.*	Tire Wire, Stainless, Fabricated Braids and Tape
REYNOLDS WIRE	*Dixon, Illinois*	Industrial Wire Cloth
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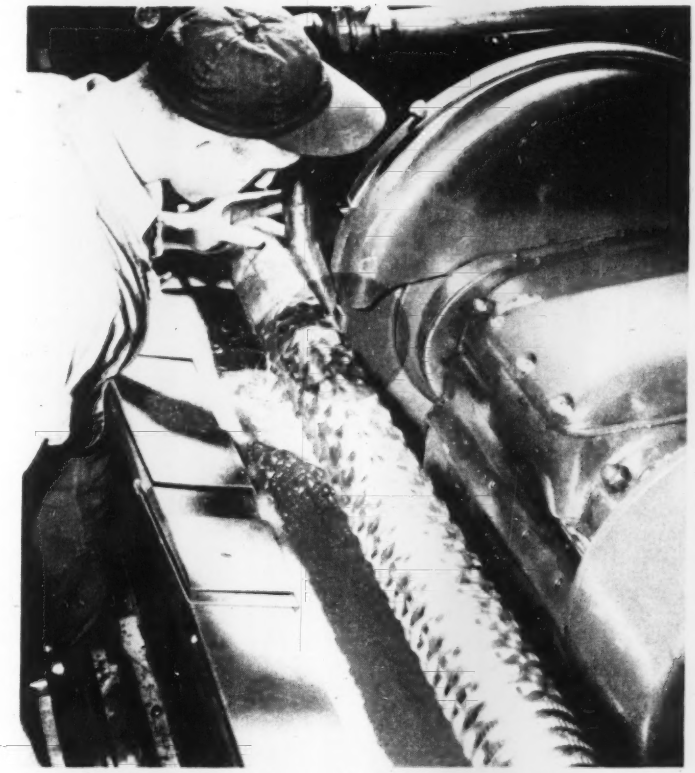


"Best Wheel Ever Used," reported by a user of Norton G Bond wheels for cylindrical grinding, sums up the industry-wide verdict.

"G Bond Wheels Cut Faster, with twice as many pieces per dressing," says a customer reporting on a centerless grinding application.

PROOF that O.D. grinding gets the "TOUCH of GOLD" with Norton G BOND wheels

. . . "Free cutting, excellent finish, considerably reduced grinding time."

. . . "Gave more than three times as many pieces per dressing."

. . . "Formed easily, held shape and removed .078" per plunge cut."

Reports like these are coming in fast from our O. D. grinding customers using the new Norton G Bond wheels — now chalking up sensational records for more units per dressing, per hour and per wheel.

That's because of the new G Bond's unique ability to hold each abrasive grain *just long enough* for maximum cutting action. Wheels made with it cut cooler . . . remove material faster . . . produce a better finish . . . produce more pieces per dressing . . . hold shape longer . . . and crush-true more easily.

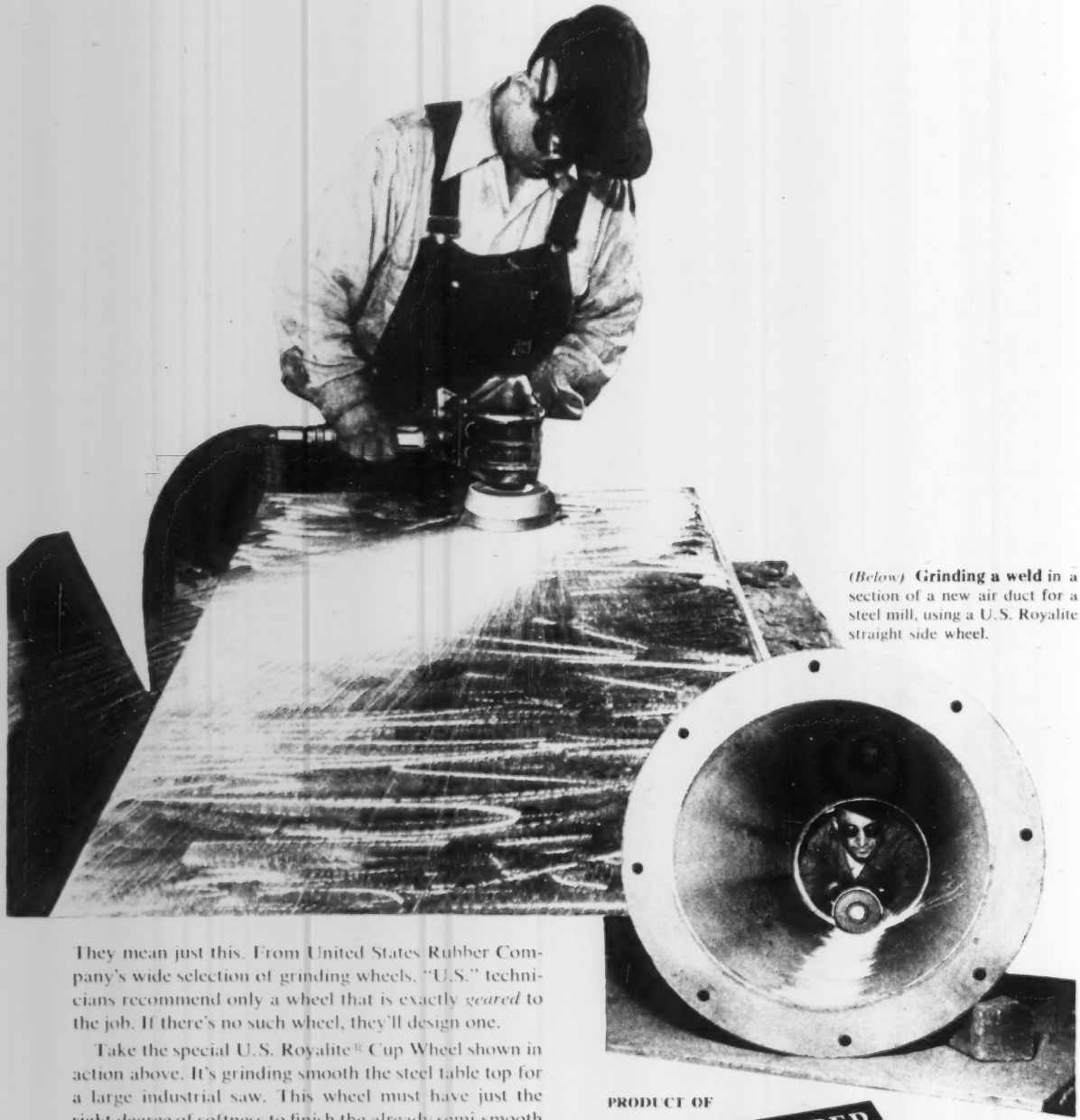
Ask Your Norton Distributor to prove how G Bond wheels will add this production-boosting, cost-reducing "Touch of Gold" to every cylindrical or centerless grinding job you do. He'll gladly arrange a test in your plant. Or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities — listed under "Grinding Wheels" in your telephone directory yellow pages. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

W-1511

NORTON
ABRASIVES

Making better products . . . to make other products better

What U. S. Rubber means by "job-geared" grinding wheels...



(Below) **Grinding a weld** in a section of a new air duct for a steel mill, using a U.S. Royalite straight side wheel.

They mean just this. From United States Rubber Company's wide selection of grinding wheels, "U.S." technicians recommend only a wheel that is exactly *geared* to the job. If there's no such wheel, they'll design one.

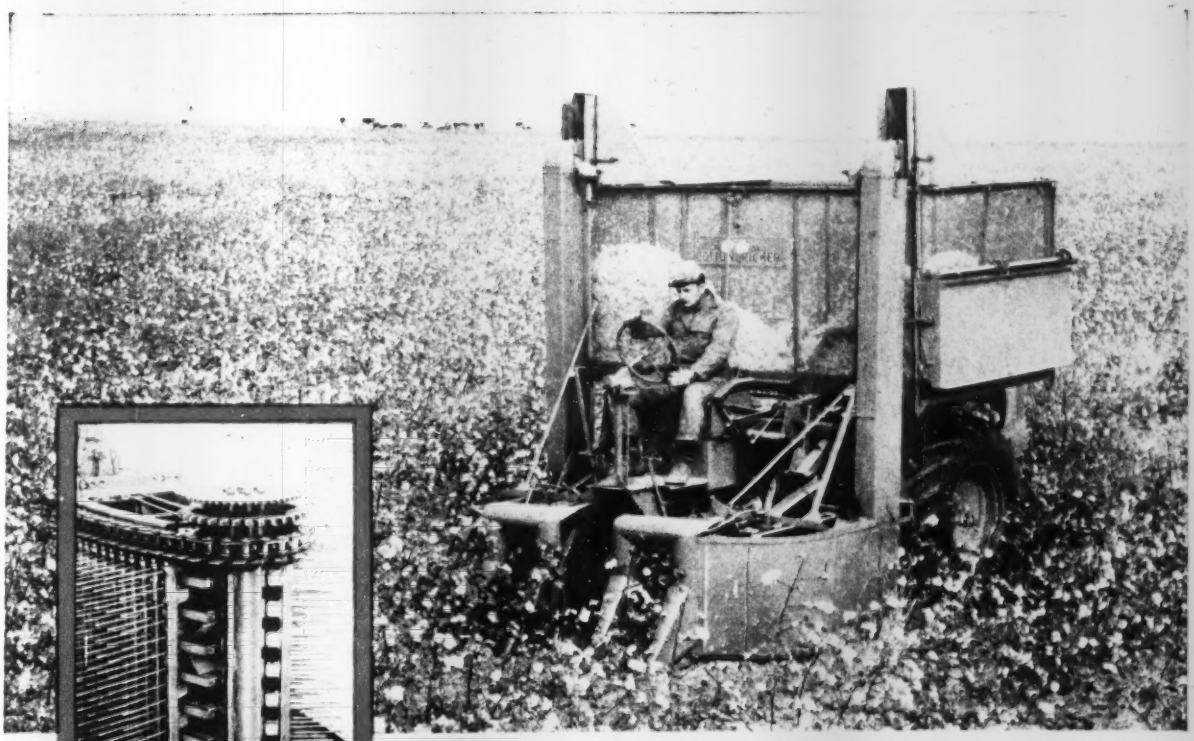
Take the special U.S. Royalite® Cup Wheel shown in action above. It's grinding smooth the steel table top for a large industrial saw. This wheel must have just the right degree of softness to finish the already semi-smooth surface. Because it's "job-geared", it works perfectly. Next time you need the right wheel, write to the address below.

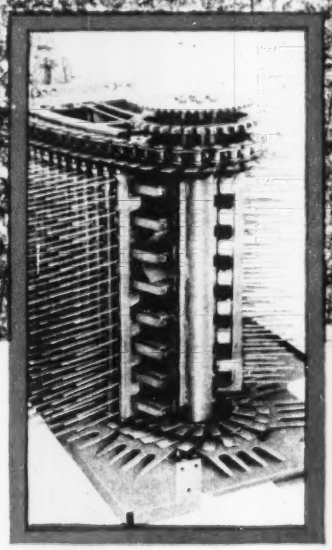
PRODUCT OF

U.S.RUBBER
SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION · ROCKEFELLER CENTER, NEW YORK 20, N. Y.





HEAT TREATING MAKES STRONG FINGERS FOR COTTON PICKERS

In the southland there's something new on the horizon . . a mechanical cotton picker. It's quite a machine . . picks two rows at once . . handles acres and acres of cotton in nothing flat compared to slow, laborious hand-picking.

It's intriguing to watch this amazing machine. It has 2,560 *rotating steel fingers* that gently probe the open cotton bolls, and deftly pick out the soft, white cotton fibres.

A few years back when the new cotton picker was in the design and testing stage, the carbon steel fingers . . all 2,560 of them came up for some serious attention. The heat treating *had* to be right. For the "fingers" had to be straight and they had to be hard. Just the right hardness . . not *too* hard or they might snap off, and not too soft or they might bend.

Allis-Chalmers brought their problem to the metallurgical and heat treating research laboratories of Lindberg Steel Treating Co. In a short time, Lindberg heat treating specialists, in cooperation with Allis-Chalmers engineers, developed an effective and successful process. It permitted the heat treating of the carbon steel fingers without scaling . . and without distortion . . to precisely the right physical properties.

Solving problems in heat treating is an everyday experience for Lindberg Steel Treating Company. Some 34 metallurgical engineers and metallurgists with a composite heat treating experience of more than 650 years are available to consult with you on any heat treating problem. Your inquiry is invited.

Plants in

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A case history of Lindberg Steel Treating Co. service to American industry

LINDBERG STEEL TREATING CO.

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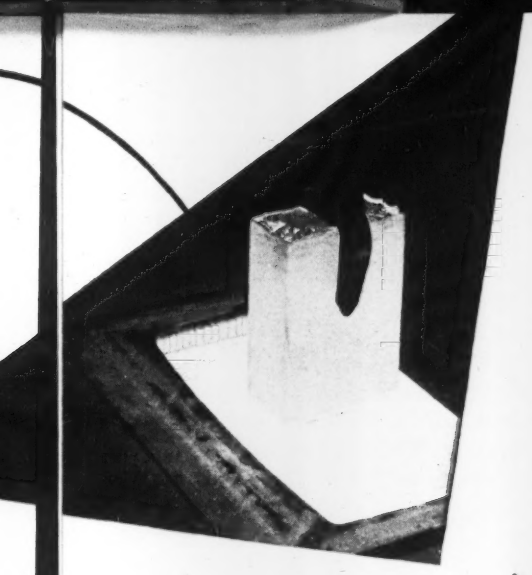
from iron...

Grefco's OLIVE HILL brick has proved its ability to pour out production through longer campaigns . . . has long been a favorite with steel men in blast furnace application.

to steel...

In the open hearth, Grefco's silica, RITEX chrome-magnesite basic brick ... and STEELKLAD, Grefco's patented basic brick encased in a permanent steel shell have contributed *much* to modern steel production.

it's

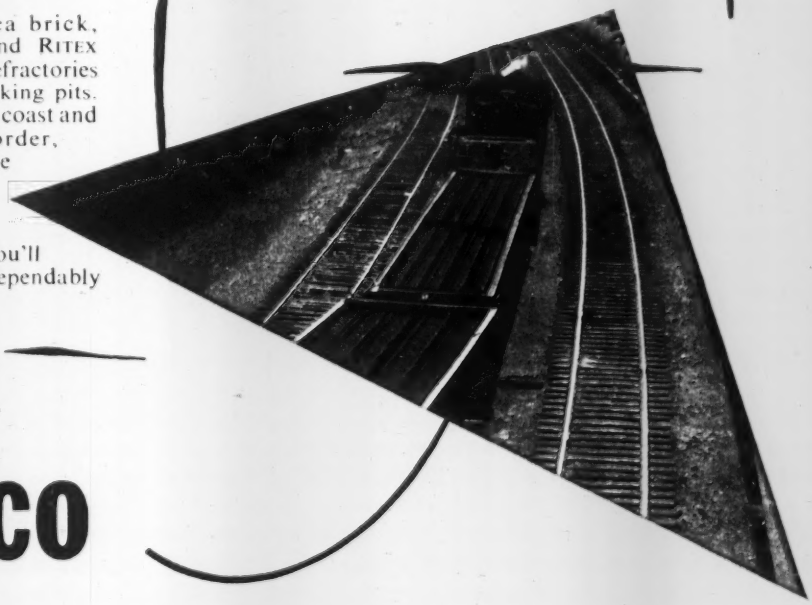


and ingot...

YOUGH silica brick, STEELKLAD and RITEX are superior refractories for lining soaking pits. From coast to coast and border to border, wherever there is a steel mill and soaking pit, chances are you'll find Grefco dependably on the job.

to supply!

Even the railroad cars in which the plate, sheet, strip or wire are shipped would not exist but for Grefco's truly *complete refractories service*. Call on Grefco yourself!



Grefco all the way!

GENERAL REFRACTORIES COMPANY
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GENERAL REFRACTORIES

PLUG A HOLE AND KEEP IT PLUGGED WITH PERMANENTE 84!

You can *keep* holes plugged, *slash* down-time for hot repairs, *boost* steel furnace production with Permanente 84 ramming and patching mix. Here's why:

Permanente 84 shrinks less than 1%—even at temperatures as high as 3000° F—because the periclase grains are pre-shrunk to maximum density and the patented bond does not form appreciable liquids below 3000° F.

This unsurpassed volume stability of Permanente 84 means fewer repairs are needed between heats. And faster repairs are possible because it's easy to use.

Act now! Start using Permanente 84 for open hearth and electric steel furnace rebuilds as well as for bottom, bank and tap hole maintenance. Let Permanente 84 help increase *your* production—and reduce your material costs through superior performance.

SEND FOR BOOKLET giving all the important advantages of Permanente 84 and the companion material, Permanente 165. Upon request, your Kaiser refractory engineer will promptly offer you research, design and installation service to help you obtain more steel tonnage per year, at lower bottom cost per ton. Call or write principal sales offices: *Chemical Division*, Kaiser Aluminum & Chemical Sales, Inc., 1924 Broadway, Oakland 12, California. First National Tower, Akron 8, Ohio.

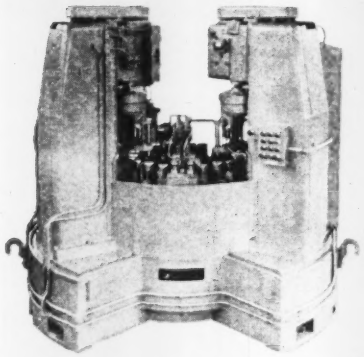
Kaiser Chemicals

Pioneers in Modern Basic Refractories

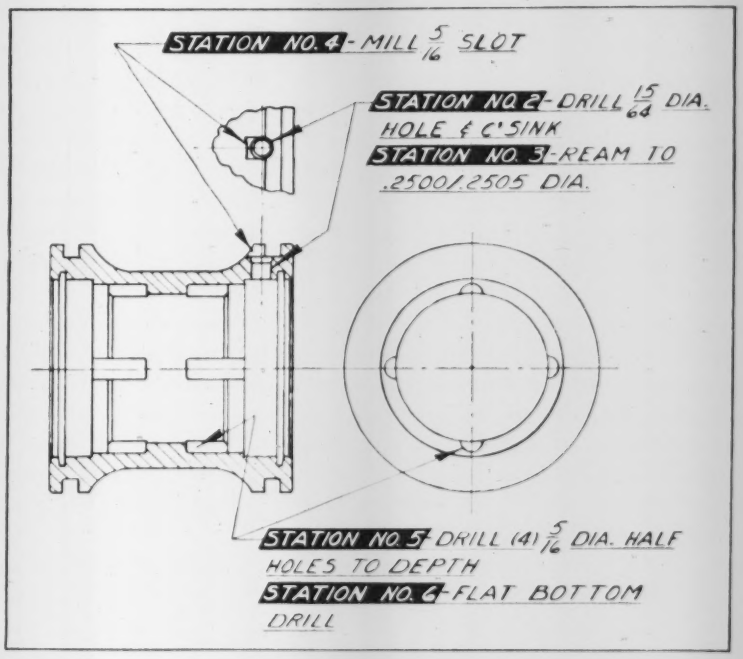
Basic Refractory Brick and Ramming Materials • Dolomite • Magnesia • Magnesite • Alumina • Periclase

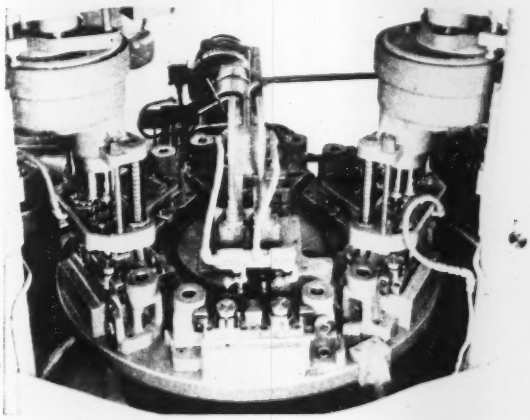
TURNER solves another *tough* production problem!

Special automatic indexing-type machine drills, reams, mills and countersinks 440 steering gear pistons per hour at 100% efficiency!



Turner's specially designed fixtures and multiple spindle heads account for the exceptional efficiency of this time-saving machine operation. An unusual feature of this particular fixture and clamping mechanism is the dead center indexing table mounting a stationary cam track. Rollers, attached to the fixture clamping mechanism, pass through as the table indexes. Limit switches, also attached to the center, make it impossible for the machine to operate unless the parts are clamped in place. In the close-up, at left, you will notice that the multiple spindle drill heads have guide pins which enter bushings in the fixture before the actual machining operation takes place. This insures extreme machining accuracy.


STATION NO. 4 - MILL 5/16 SLOT
STATION NO. 2 - DRILL 15/64 DIA. HOLE & C'SINK
STATION NO. 3 - REAM TO .2500/.2505 DIA.
STATION NO. 5 - DRILL (4) 5/16 DIA. HALF HOLES TO DEPTH
STATION NO. 6 - FLAT BOTTOM DRILL



Turner solves high production problems such as this by first studying the problem thoroughly, applying years of technical experience; then, by designing fixtures and spindle heads *exactly suited to your job.* With all Turner special purpose machines, standard bases and columns are used to keep manufacturing costs down. It means you are assured a machine specially designed for your application, yet without the high extra costs you might expect. Drop us a line; we'll be happy to look over your particular production problem.

The sequence of operations is as follows:

Station 1: Operator places part in the RH side of the fixture and the machine indexes to Station 2.

Station 2: (Four) 5/16" port holes are drilled to depth. At the same time, the next fixture has come into position at Station 1 and the loading operation is repeated. The first fixture moves to Station 3 and the (Four) 5/32" radius port holes are flat bottom drilled.

Station 4: The 5/16" slot is milled.

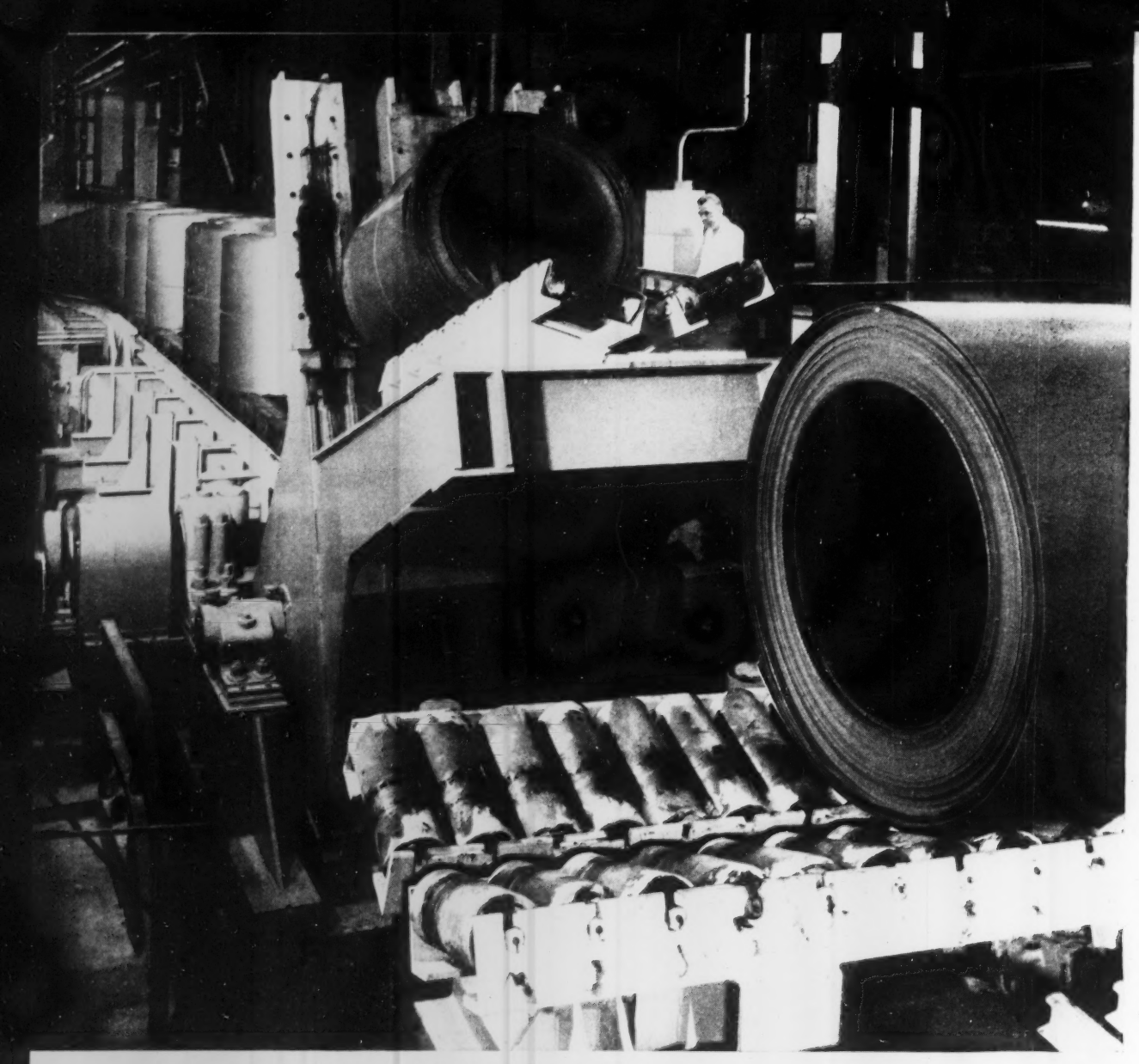
Station 5: The 15/64" hole is drilled and countersunk.

Station 6: The 15/64" hole is reamed to .2500/.2505".

The fixture is then indexed to starting Station 1 where the part is automatically unclamped, removed from the RH side of the fixture and placed end for end on the LH side of the fixture. At the same time, the new part is loaded onto the RH side of the fixture as in the first cycle of the machine. From this point on, the machine cycle is the same as previously described and for each complete cycle of the machine, the part will be completely machined as per the above operations.

TURNER BROS. INC.
2625 HILTON ROAD
FERNDALE 20, MICHIGAN

DESIGNERS and BUILDERS of:
- **SPECIAL MACHINES**
- **JIGS and FIXTURES**



By knowing in advance what and how you manufacture . . .

Pittsburgh Steel custom builds sheet steel to meet your production line requirements

Metallurgists start each sheet order with selection of correct raw materials, then control each process from blast furnace to proper packaging for shipment to customer.

Manufacturers of automobiles, household appliances, construction machinery, building materials, and the hundreds of other useful products made from steel sheets must meet keen competition . . . they must be able to turn out quality products at the lowest possible prices and make a reasonable profit.

Pittsburgh Steel wants to be sure its customers get a better than even start. To do this, it has adopted a policy of custom building its sheet steel to meet your production requirements, making certain the sheet you order will meet specifications.

Here's how alert men in the metallurgical department have been able to hit top-quality hot rolled sheets right from the start. First, they have a brand new mill, the newest and most modern of its type in the country. They also have the latest gauges, controls and testing apparatus for assuring quality.

They have another working tool—one that can't be bought and installed

(Advertisement)

Analyzing for Carbon—Bill McShane, Assistant Chief Chemist, holds steel chips the size of finely ground coffee. He is showing them to Combustion Chemist, Charles Keznor, who will weigh and put them into the electric carbon combustion furnace at right, where chips are burned in a stream of oxygen. The carbon dioxide formed is absorbed into a bulb. It is then weighed and the amount of carbon in the steel calculated accurately.

Studying Internal Quality—Highly polished samples of steel strip mounted in plastic are examined on this inverted metallurgical microscope. Shown above, George Chapman, supervisor of the metallurgical lab, is preparing to inspect the grain structure of the steel. Lack of foreign elements in the steel indicates that it is clean steel.

like a machine—which is the most important of all. It is the human element, the willingness, the desire of every man along the line from raw materials to shipping room to cooperate with each other to turn out the finest, the best-quality flat rolled steel that has yet been rolled.

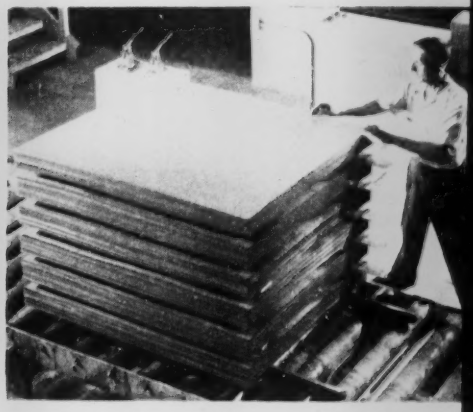
Pittsburgh Steel's metallurgists believe in close cooperation—not only with the men they work with, but the men they work for—the customers. That's why they prefer to visit a customer's plant before the sheet order is entered. They observe manufacturing processes, see how sheets are being shaped, study blueprints, get all the information necessary in order to determine their recommendations for the best chemical analysis of steel, the correct internal structure, surface finish, what size sheets will work best.

When specifications are approved by the customer, the next step is to assemble the best grades of raw materials—the iron ore, coke, and limestone, then start at the blast furnaces. Through iron making, steel making, pouring ingots, rolling ingots into slabs, rolling slabs into hot rolled sheets—every operation and every process, Pittsburgh Steel metallurgists are on the job day and night around the clock making sure the order is being filled correctly.

What about results? Reports from customers indicate the metallurgists are hitting the mark. Thousands of tons of Pittsburgh Steel's sheet are "proving out" with highly satisfactory performance on scores of production lines.

If you use steel sheets in the manufacture of your products and you have a problem, why not talk to a man from Pittsburgh Steel?

Testing for Physicals—Metallurgist, Ben Labeka, checks the finished steel for physical qualities. Here he is, shown above, testing with an Olsen ductility tester, to check the steel for ductility and ease of forming for fabrication. Ben, one of the metallurgists who has helped set up the specifications of the steel after examining customers' blueprints and studying their fabricating methods, now knows that this steel will meet all requirements of the customer.



Where Coils Become Sheets—The hot shear line, built for continuous line processing of hot rolled steel, converts coils into individual high-quality sheets. A processor loosens any mill scale. A side trimmer trims the steel to exact width specification. A flying sheer cuts the steel to lengths of 3 feet to 30 feet. The steel passes through two sets of levelling rolls to assure accurate flatness. Sheets are inspected and defective sheets rejected. Prime sheets are stacked at end of the line, weighed and banded for shipment.

"Everything New But The Name"

Pittsburgh Steel Company

Grant Building · Pittsburgh 30, Pa.

Sales Offices in Principal Cities Throughout the Country

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Advertisement

ELECTROMET Data Sheet

A Digest of the Production, Properties, and Uses of Steels and Other Metals

Published by Electro Metallurgical Company, a Division of Union Carbide and Carbon Corporation, 30 East 42nd Street, New York 17, N. Y. • In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario.

Why 3 Per Cent Chrome Steel Makes Good Castings for Wear Resistance

Castings of 3 per cent chromium steel have been used in substantial tonnages, for many years, for various equipment parts demanding good wear resistance. Such castings offer an excellent combination of hardness and toughness. Typical applications are crusher parts used in rock and ore crushing equipment, swing hammers for pulverizing coal, railroad switch frogs, gears, pulleys, sheaves, and other castings that must meet severe conditions of wear.

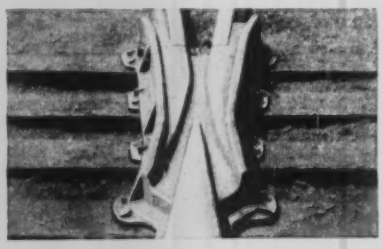

Fig. 1. Railroad switch frogs, which are subject to severe wear, give outstanding service when cast of 3 per cent chromium steel.

The 3 per cent chromium steels, are normally produced in a carbon range of 0.30 to 0.50 per cent. They exhibit excellent depth hardening properties, which simplify heat treatment and insure uniformity throughout heavy sections. The analysis is usually modified by a molybdenum addition, since this element aids in increasing hardenability.

Fig. 2. Grating for top of shake out machine is cast of 3 per cent chromium steel to give good wear resistance and long life.

Properties Improved by Heat-Treatment

The best properties of 3 per cent chromium steels are developed through heat-treatment. Generally, this consists of a normalizing treatment from 1650 deg. F., followed by tempering in a range between 1000 and 1250 deg. F., depending on the physical properties desired. Double normalizing is sometimes used to obtain further improvement in the grain structure. With carbon on the high side of the specification, air-quenched castings show a Brinell hardness number of over 400 in 3-inch sections. This hardness is practically uniform throughout the section. Oil quenching is employed to produce higher hardness and depth of penetration, and even in a 4-inch section, a hardness number of over 500 Brinell is obtained.

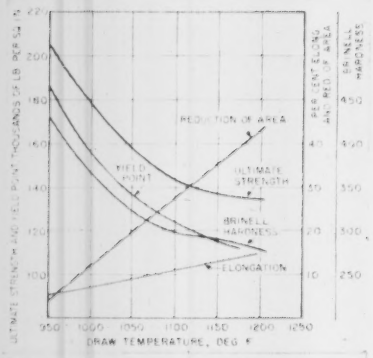

Fig. 3. These curves show the response to tempering of a 0.37 per cent carbon, 2.93 per cent chromium, 0.35 per cent molybdenum steel previously normalized from 1650 deg. F.

The steel also shows good response to tempering. After a normalize and a 1100 deg. F. treatment, it has a tensile strength close to 150,000 pounds per square inch, with an elongation value of about 12 per cent, and a Brinell hardness of about 300. When greater ductility is required, tempering should be done at higher temperatures. However, in such instances, some strength and hardness are sacrificed.

Fig. 4. Photomicrograph of 3 per cent chromium steel normalized from 1650 deg. F. and tempered at 100 deg. F. (X250). The pseudo martensitic structure is well suited to resist abrasion.

Effect of Other Alloy Additions

Molybdenum in the range from 0.30 to 0.50 per cent will improve depth-hardening characteristics and aid in reducing susceptibility to temper brittleness in the lower temperature ranges. If the molybdenum-bearing steel contains relatively high carbon (0.40 to 0.60 per cent) additions of approximately 0.08 to 0.10 per cent vanadium provide greater uniformity in hardening. Small additions of silicon increase strength and hardness and this element is sometimes increased to 0.80 or 1.00 per cent. Manganese is added in amounts between 0.50 and 0.80 per cent.

Metallurgical Service Available

When you have occasion to produce castings for applications involving severe abrasion and wear, it will pay you to investigate the advantages of using 3 per cent chromium steel. If you need help on some specific metallurgical problem, be sure to consult one of ELECTROMET'S specially trained metallurgists and engineers. For further information, write to the nearest ELECTROMET office: in Birmingham, Chicago, Cleveland, Detroit, Los Angeles, New York, Pittsburgh, or San Francisco. In Canada: Welland, Ontario.

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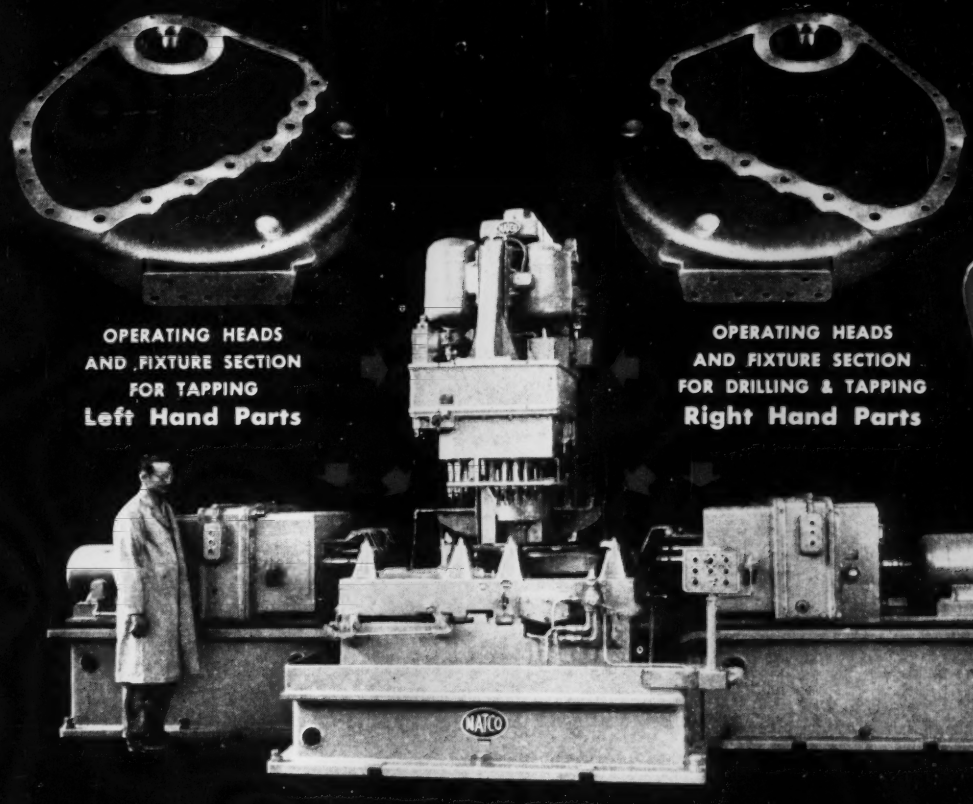
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OPERATION DETAILS

LEFT HAND PART

POSITION 1
Remove and Load

POSITION 3
Vertical Head
Tap 4 Holes
L. H. Horizontal Head
Tap 4 Holes

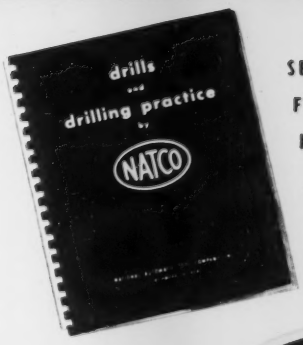
POSITION 2
Vertical Head
Idle
L. H. Horizontal Head
Tap 3 Holes

RIGHT HAND PART

POSITION 1
Remove and Load

POSITION 3
Vertical Head
Drill 8 Holes
R. H. Horizontal Head
Tap 4 Holes

POSITION 2
Vertical Head
Tap 8 Holes
R. H. Horizontal Head
Tap 3 Holes



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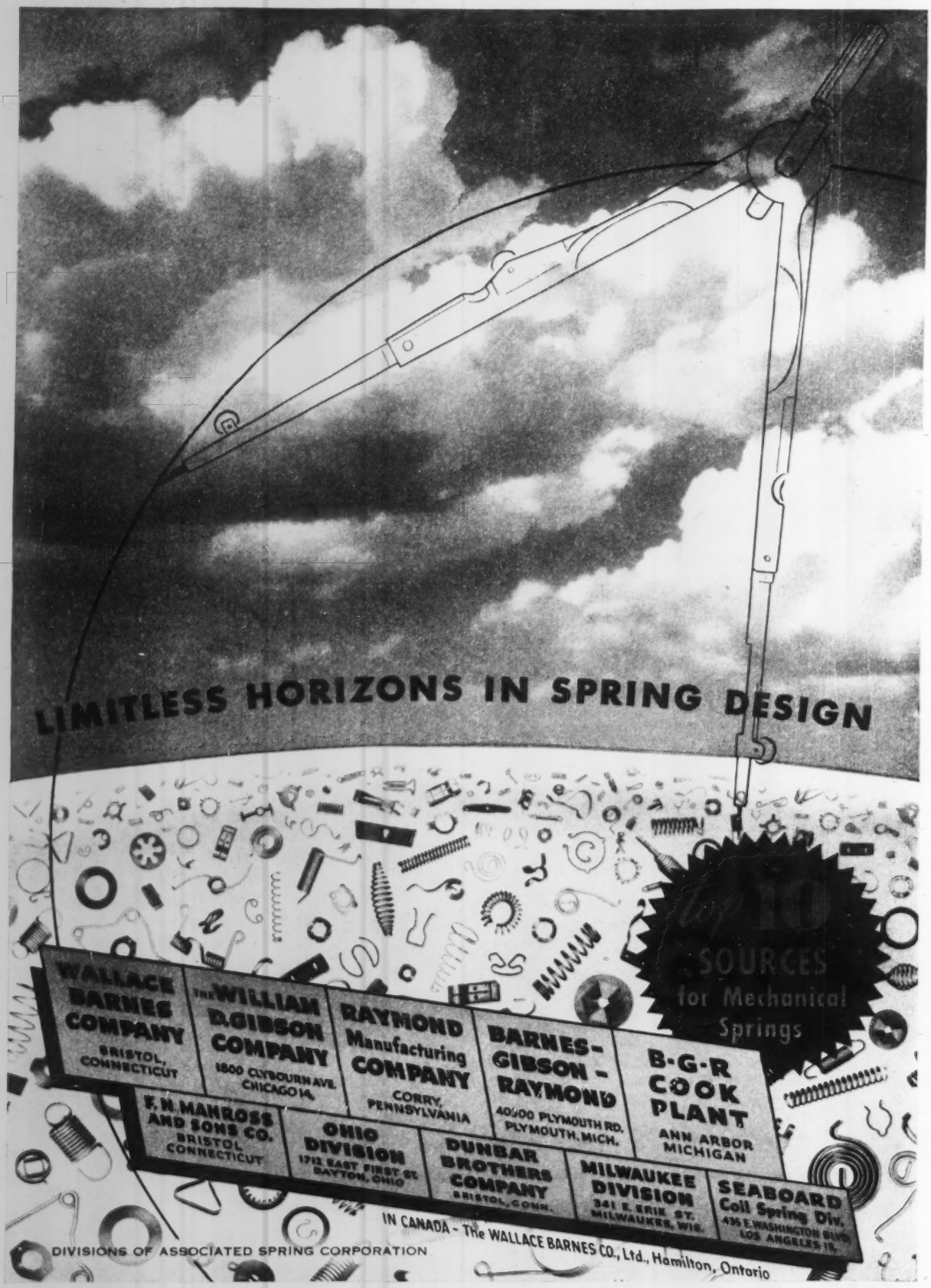
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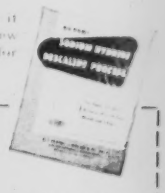

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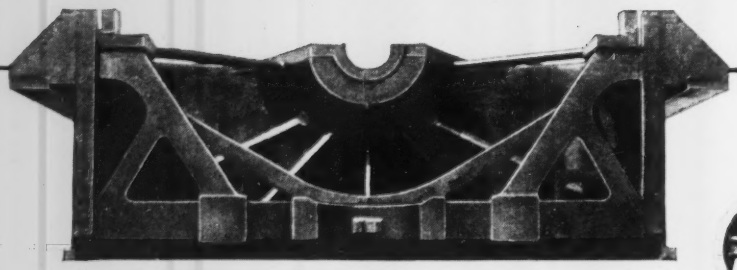

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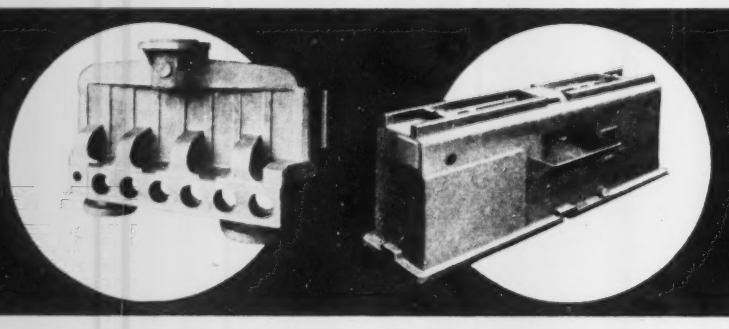
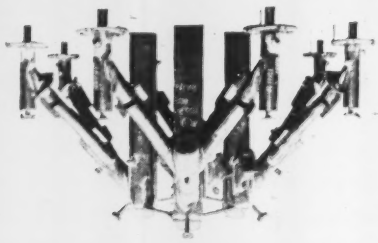
or
non-ferrous



simple
or
intricate



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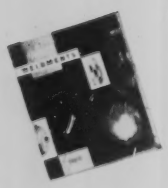

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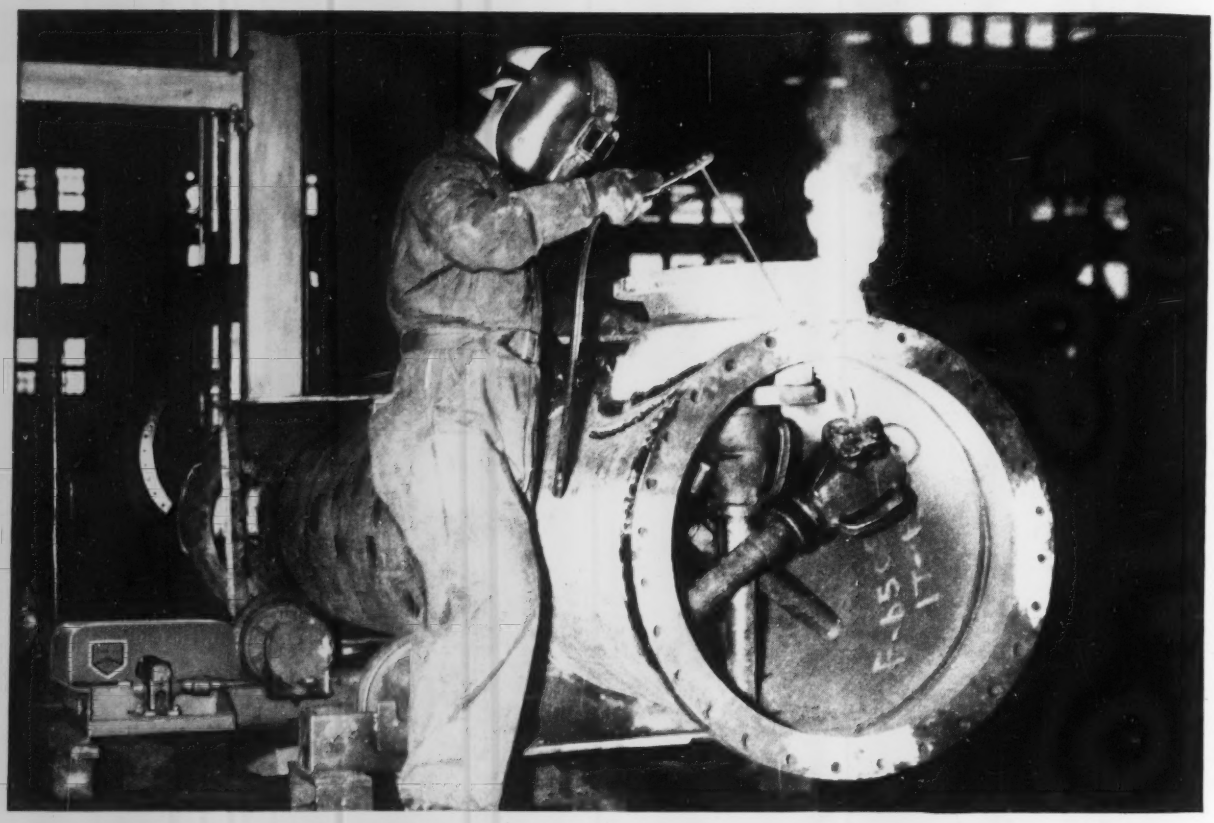

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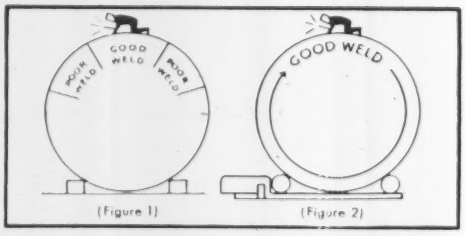

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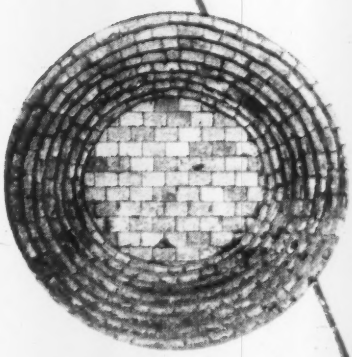

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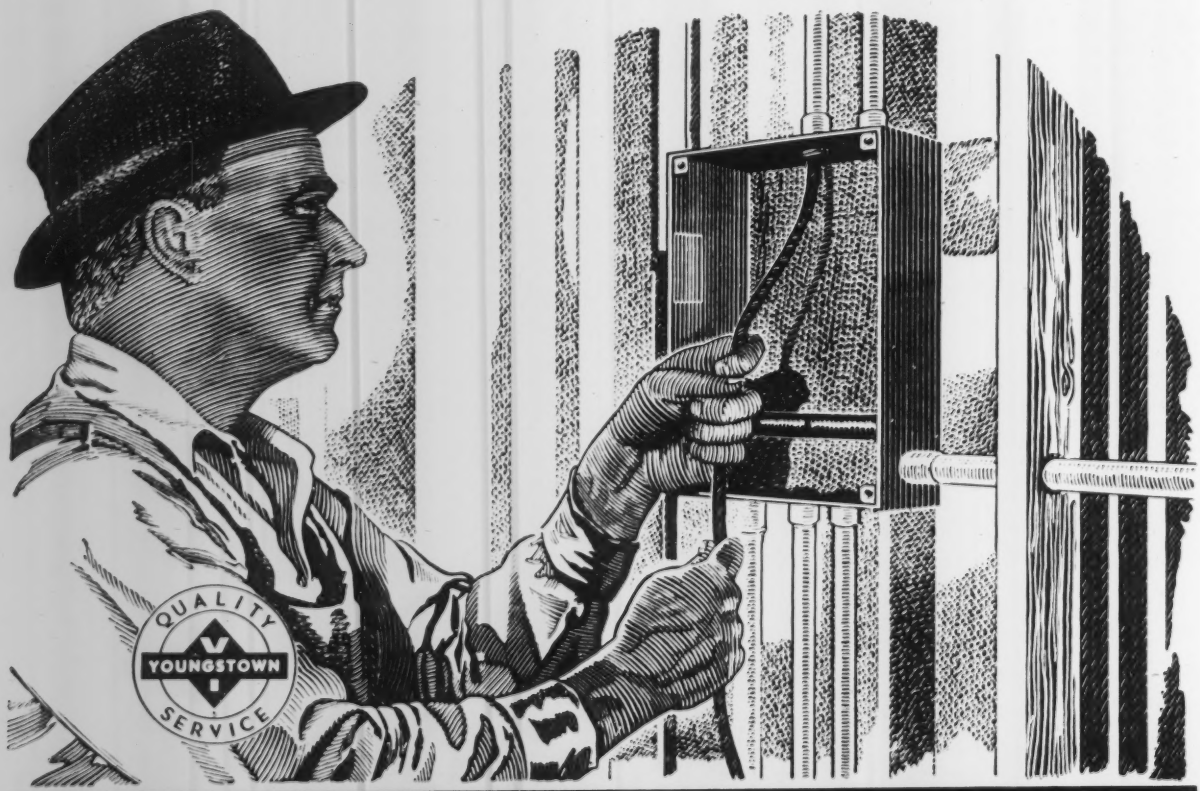

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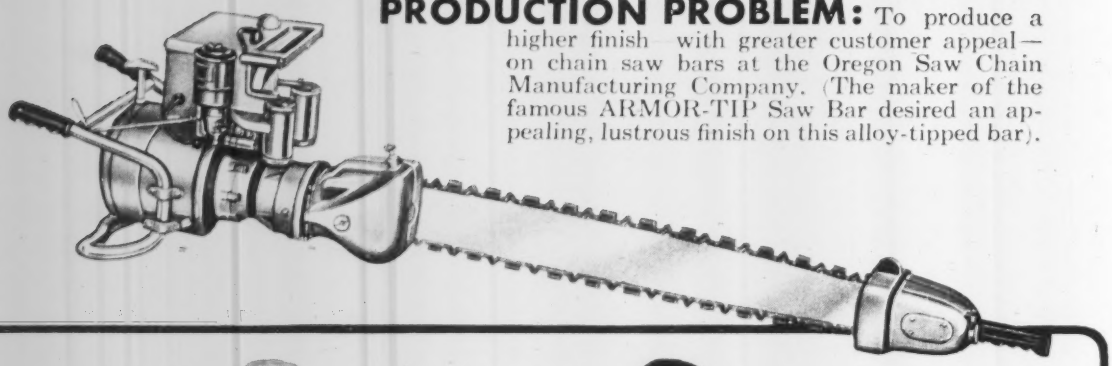

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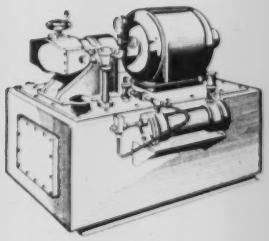

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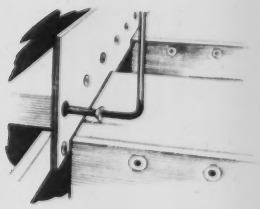

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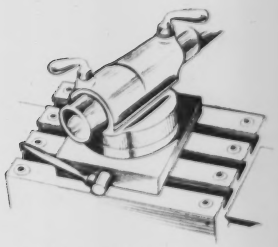

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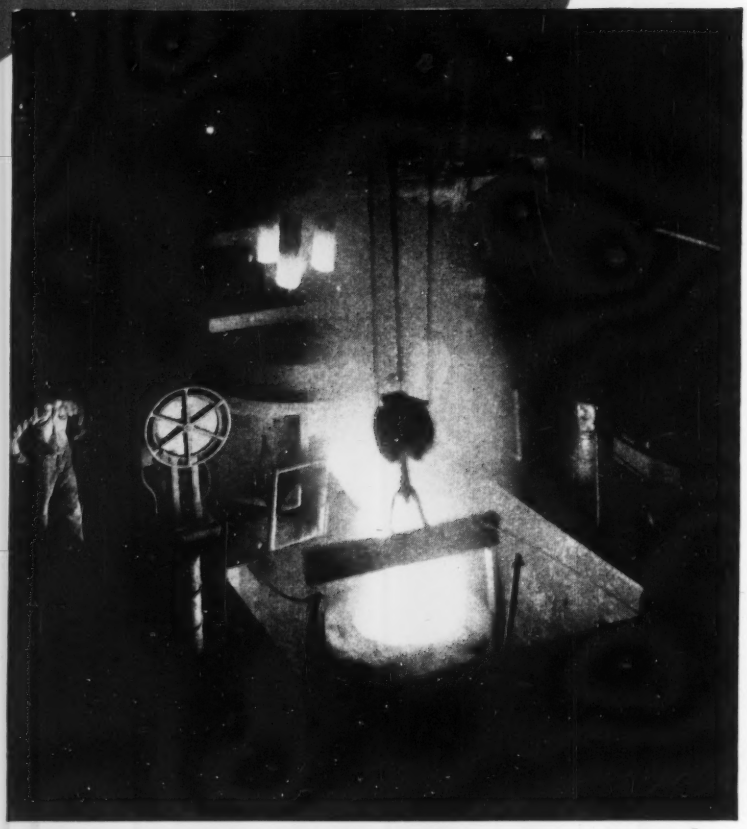

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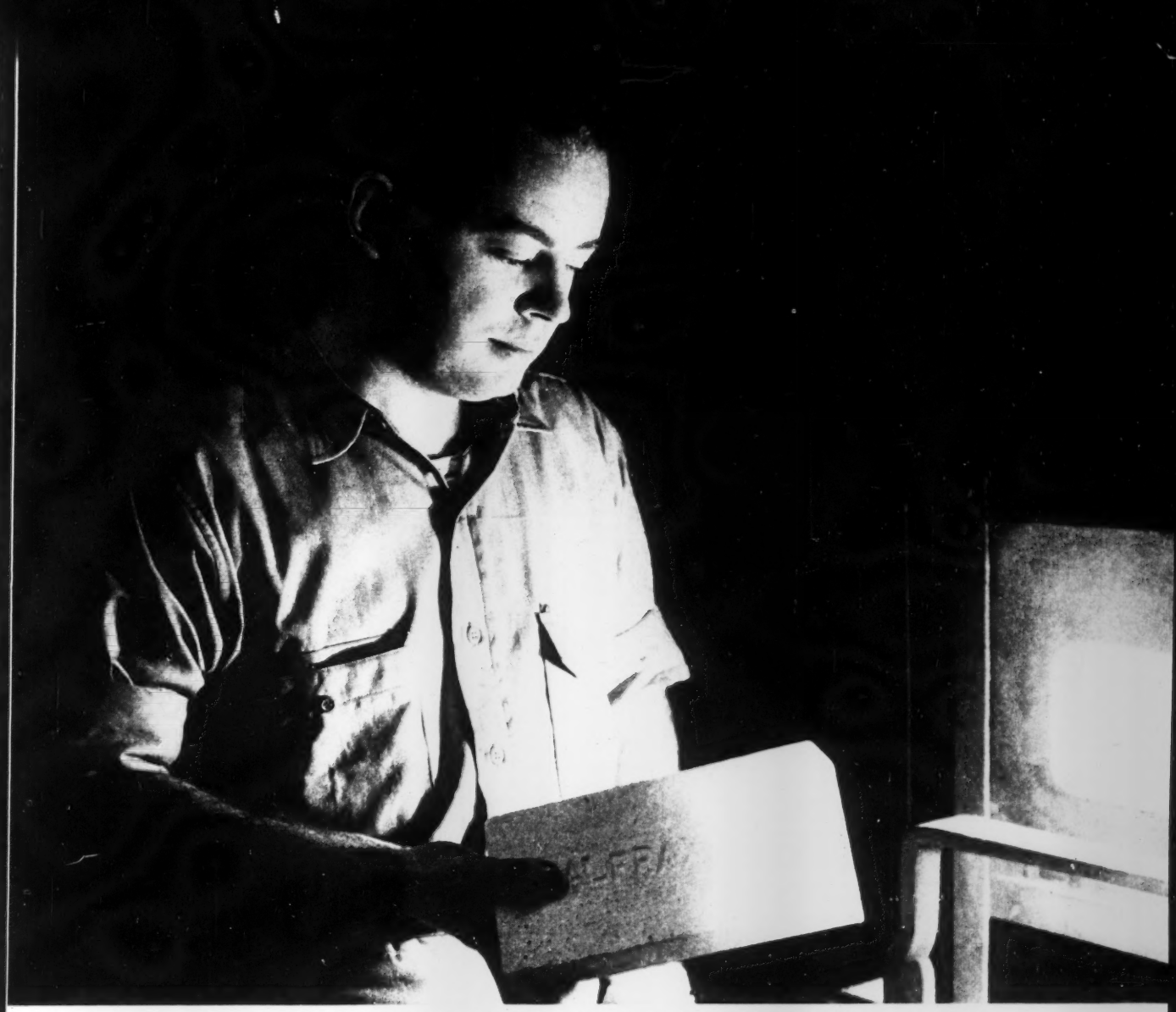
MOORE RAPID

WHEN YOU MELT... *Lectromelt*



Here's striking evidence of insulating ability: Though one end of this brick is incandescent—having been heated to over 2000 F—the other end is held *in the bare hand.*

"Bubble-Brick" insulates at over 3000 F

Pictured here is one of the most heat-resistant refractories available — and one of the most stable. It shows very little shrinkage, or other changes, *even at maximum burning temperatures of most fuels!* It stands higher heats (has a P.C.E. value 39-40, equivalent to 3389-3425 F), and greater loads than previously possible with low heat capacity refractories.

ALFRAX® BI refractories are literally *made of bubbles;* hollow spheres of Al_2O_3 specially bonded together. They are light in weight (a 9" straight weighs only 4.8 lbs.); have low thermal conductivity (average 7 Btu/hr, sq ft and °F/in. of thickness at 2200 F); and therefore have low heat capacity. They are also one of the most inert materials known. They are unaffected by furnace atmospheres, or combustion gases of commercial fuels.

These "bubble-brick", as they are sometimes called, are used in main linings as sidewalls, arches, doors, etc., and also for backing-up linings. They are used in many types of furnaces (e.g. powdered metallurgy furnaces, aluminum reverberatory furnaces, ceramic kilns, synthesis gas generators). The advantages are: longer refractory life, closer heat control, and a furnace that heats up quicker and needs less fuel.

ALFRAX BL aluminum oxide refractory is available as brick, special shapes, standard cements, and as a *castable* cement that you just mix with water and pour. For information about the properties of this and other unusual super refractories by CARBORUNDUM just mail this coupon.

CARBORUNDUM

Registered Trade Mark

Dept. G-93 Refractories Division
The Carborundum Company
Perth Amboy, N. J.

Please send free copy of Super Refractories booklet to:

Name _____

Position _____

Company _____

Street _____

City _____ Zone _____ State _____

To Serve You with Fine Quality

COLD FINISHED BAR STEELS

SINCE 1891
PRODUCERS OF

Cold Drawn Bars
Turned & Polished Bars
Ground Shafting
Screw Stock
Extra Wide Flats
Carbon & Alloy Steels
Strain-Tempered Bars

To supply American industry economically with top-level production steel is the goal of our continuing expansion program.

The latest step in the program is the construction of our New Detroit Plant located at 8 Mile and Hoover Roads.

The first section . . . now completed and in operation . . . is one of four units scheduled for this site. It provides service throughout the Detroit area and surrounding territory for a quality line of Carbon and Alloy Bar Steels.

For 62 years, we have specialized in the manufacture of dependable Cold Finished Steel Bars that help users to maintain high production and insure finely finished parts at lower costs.

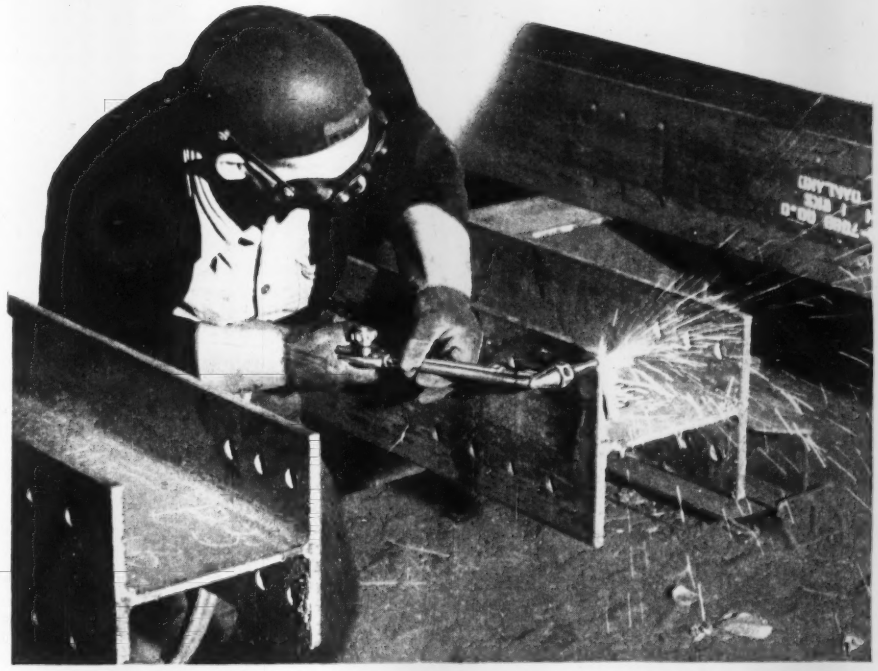
Bliss & Laughlin experience is your assurance of getting the right steel for the job.

BLISS & LAUGHLIN, INC.

GENERAL OFFICES: HARVEY, ILLINOIS
SALES OFFICES IN ALL PRINCIPAL CITIES

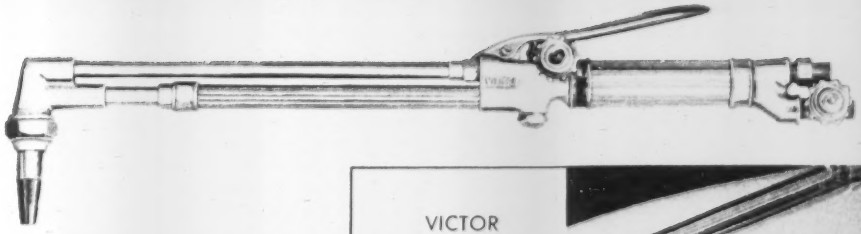
FOUR PLANTS: HARVEY, ILL. • DETROIT, MICH. • BUFFALO, N. Y. • MANSFIELD, MASS.

BL
SINCE 1891



the man on the job...

...Wants VICTOR Reliability



He gets reliability and efficiency in VICTOR welding and cutting torches, and regulators because they're built right.

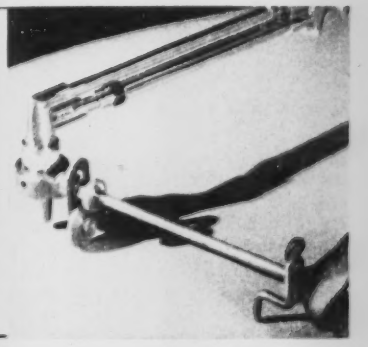
Precision machining assures leak-proof joints and ease of maintenance. Four head angles—90°, 75°, 45° or straight—and 4 lever positions—top or bottom and forward or rear of handle—enable you to choose the torch that exactly fits the job in hand.

VICTOR's complete range of tips, in sizes 000 through 16, are designed to give maximum cutting speed and gas savings on any job from light sheet to heavy plate cutting.

See for yourself why it costs less to own and operate VICTOR. Ask your VICTOR dealer for an on-the-job demonstration *TODAY*.

VICTOR
CIRCLE CUTTING
ATTACHMENT

adjusts to
various heights
and diameters
from 1¼" to 28".



VICTOR

Welding and Cutting Equipment
Since 1910

VICTOR EQUIPMENT COMPANY

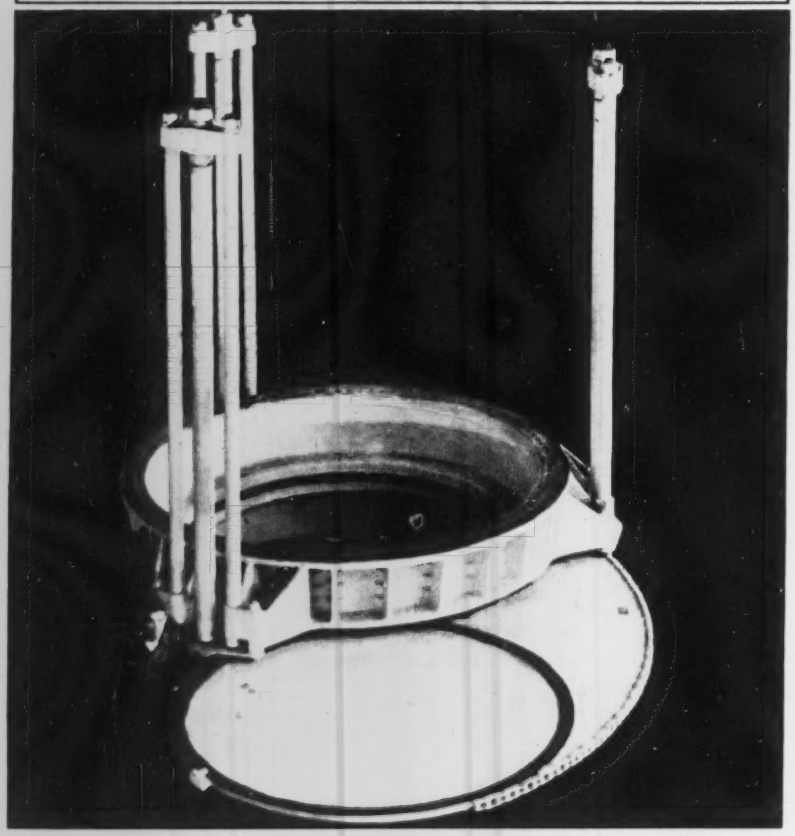
3821 Santa Fe Ave.
LOS ANGELES 58

844 Folsom Street
SAN FRANCISCO 7

1312 W. Lake St.
CHICAGO 7

(Advertisement)

HOW A FORCE OF NATURE IMPROVES STEEL MILL SAFETY



Designed to protect men and equipment, this heavy duty Bailey Valve was produced for one of the nation's major steel makers. Although its diameter is 120" and its weight is close to 42,000 lbs., it is precisely machined to assure a tight, positive gas seal.

AN UNFAILING force of nature the linear expansion and contraction of steel is being used to increase steel mill safety. This powerful force, applied to Bailey Thermal Expansion Goggle Valves, provides a safe, dependable means of positive shutting off large gas mains in emergencies or for repairs.

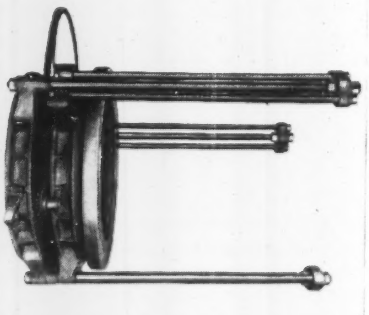
The Function of Goggle Valves

Ranging in diameter from 36" to 120", this type of valve long has been industry's standard method for controlling gas in the large mains for blast furnaces, gas washers and boilers. They take their name from one of their component parts a large, moveable plate shaped like a pair of aviation goggles. This plate has one "goggle" open, the other of solid steel. When a gas main is in operation, the open goggle allows gas to flow through it freely; when the gas is to be shut off, the plate is moved until the closed goggle blocks the main, forming a tight, leak-proof seal.

BAILEY THERMAL EXPANSION GOGGLE VALVES

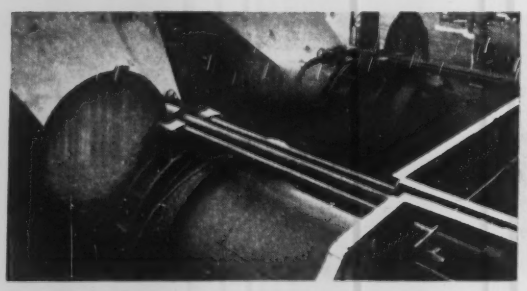
Safety and efficiency in closing the larger sized gas mains are provided by Bailey Thermal Expansion Goggle Valves. In them, the powerful force of linear expansion and contraction of three steel tubes is used to free or clamp the goggle plate—providing an absolutely gas-tight seal.

In operation, steam is passed into the tubes, which are spaced evenly around and perpendicular to the rigid steel flanges of the valve. The resulting expansion frees the heavy goggle plate so it may be swung to the open or closed position. When the steam is shut off, contraction of the tubes takes place, closing the flanges tightly against the goggle plate. Since both sides of the plate are machined to conform to the machined edges of the valve flange, Bailey Valves are leak-proof in both open and closed positions.



Bailey Thermal Expansion Goggle Valves are produced in diameters from 36" to 120".

Sound design and precision manufacture are combined in these valves to assure the ultimate in safety and reliability. They have been thoroughly proved on the gas mains of blast furnaces, gas washers and boiler plants. Bailey Thermal Expansion Goggle Valves are completely dependable in hot or cold, dirty or clean gas mains.



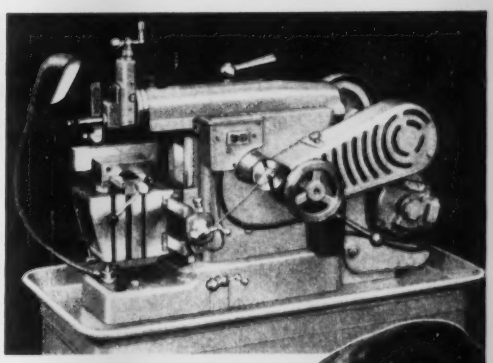
These valves are in service on an Elex Precipitator. In this view the goggle plates are in the open position.

WILLIAM M. Bailey COMPANY

1221 Banksville Road
Pittsburgh 16, Pa.

South Bend 7" Shaper

FAST · EFFICIENT · ECONOMICAL!

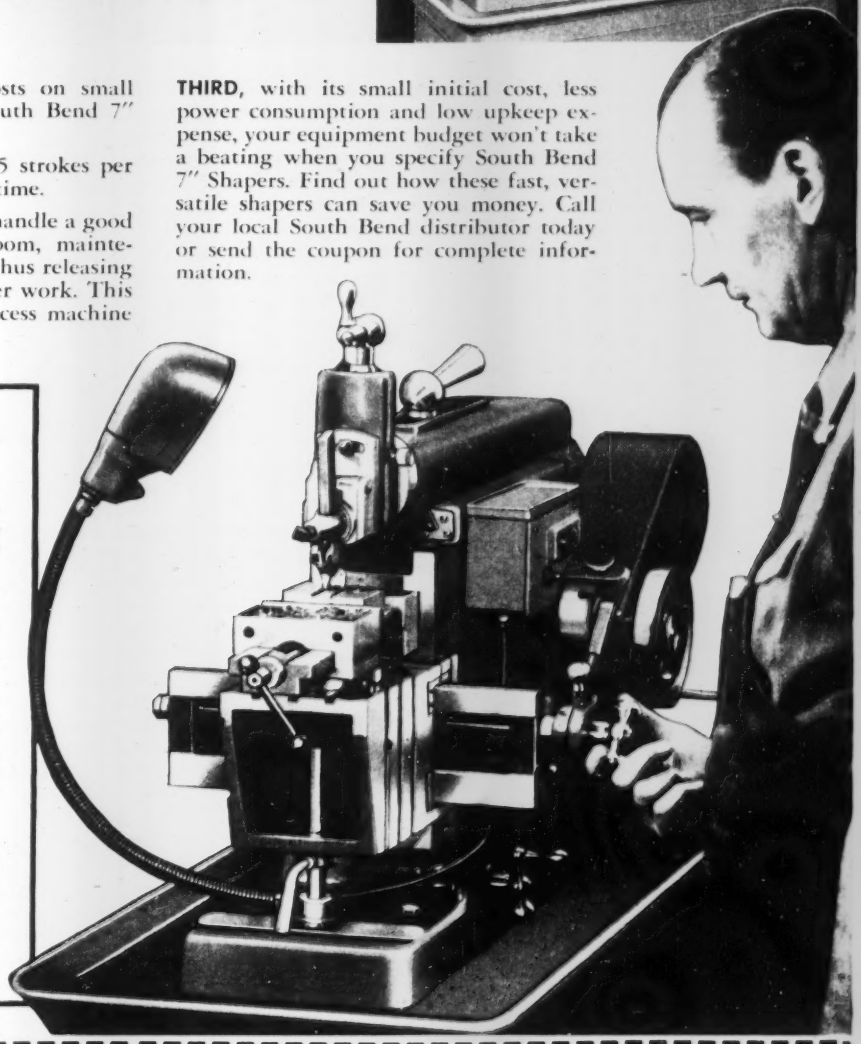


Watch your machining costs on small work go down when a South Bend 7" Shaper takes over.

FIRST, its speed — 42 to 195 strokes per minute reduces machining time.

SECOND, its 7" stroke will handle a good share of your small toolroom, maintenance and production jobs thus releasing your heavy shapers for larger work. This stops the waste of using excess machine capacity on small jobs.

THIRD, with its small initial cost, less power consumption and low upkeep expense, your equipment budget won't take a beating when you specify South Bend 7" Shapers. Find out how these fast, versatile shapers can save you money. Call your local South Bend distributor today or send the coupon for complete information.



SPECIFICATIONS

RAM

Stroke length	0 to 7"
Strokes per min. (4)	42 to 195
Cutting speeds	3 to 114 feet per minute

TOOL HEAD

Vertical travel	3"
Tool post slot	3/8" x 7/8"
Head swivels	360°
Clapper swivels	35°

TABLE

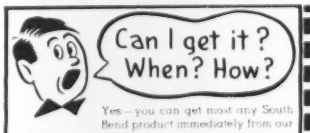
Vertical travel	5"
Horizontal travel	9 1/2"
Power cross feeds (6)	.002" to .012" (reversible)
Size	6 5/16" x 5" x 5 3/8"
Distance from ram	1/2" to 5 1/2"

VISE

Maximum opening	4"
Jaw width	4"
Jaw depth	1"
Height over table	2 11/16"

MOTOR

1/3 or 1/2 h.p.



Yes—you can get most any South Bend product immediately from our distributor's stocks in principal cities—items not stocked, shipped promptly from factory.

Three Ways to Order:

1. See or telephone nearest distributor.
2. Order by mail from your distributor.
3. If no distributor is nearby, order direct from factory.

South Bend machine tools with accessories may be purchased on convenient terms up to 12 months.

PLEASE SEND INFORMATION CHECKED:

- ☐ 9" and 10" BENCH LATHES
- ☐ 10" to 16-24" FLOOR LATHES
- ☐ DRILL PRESSES
- ☐ 7" BENCH SHAPERS
- ☐ TOOL GRINDERS
- ☐ 1/2" & 1" Collet TURRET LATHES

Name _____ Company _____

Street _____ City & State _____

Building Better Tools Since 1906 • SOUTH BEND LATHE • South Bend 22, Indiana

You know you're on the right track

Director of destinations, the towerman deftly sorts out traffic . . . fans it out far and wide, so that the right shipments get to the right places at the right time.

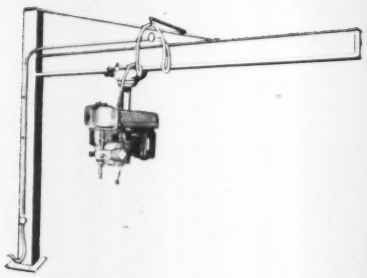
The same practiced precision goes into traffic control in the modern mills at Bristol. Here every operation is safe in hands that have the same deft touch . . . that keep things moving so that every shipment of Brass sheet, rod and wire gets through to its destination without switching, sidetracking, or running behind time.

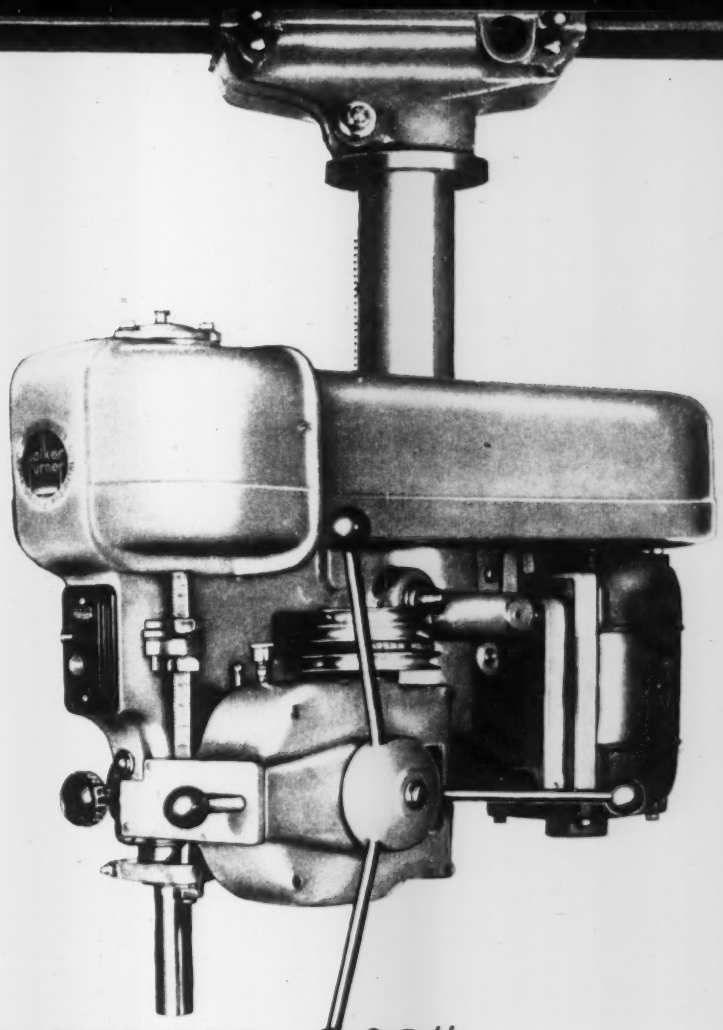
And this is just *part* of what is meant by "Bristol-Fashion".

. . .

The BRISTOL BRASS CORPORATION, makers of Brass since 1850 in Bristol, Conn. Offices or warehouses in Boston, Chicago, Cleveland, Dayton, Detroit, Los Angeles, Milwaukee, New York, Philadelphia, Pittsburgh, Providence, Rochester.

"Bristol-Fashion" means **Brass at its Best**





This WALKER-TURNER 20" OVERHEAD DRILL PRESS SET-UP

saves handling time . . . cuts costs

Wherever large or heavy parts or units are to be worked, this set-up—utilizing a WALKER-TURNER DRILL HEAD with its special ball-bearing carriage traveling along a boom—can save handling time and costs . . . bring new production economies. Special set-ups like this make it possible to get WALKER-TURNER precision drilling (either hand or power feed) at surprisingly low cost.

WALKER-TURNER

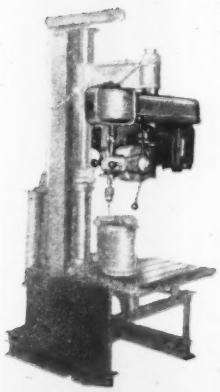
• DIVISION •

KEARNEY AND TRECKER CORPORATION

PLAINFIELD, N. J.

DRILL PRESSES—Hand and Power Feed • RADIAL DRILLS • Wood and Metal Cutting BAND SAWS • TILTING ARBOR SAWS • RADIAL SAWS JIG SAWS • LATHES • SPINDLE SHAPERS • JOINTERS • BELT and DISC SURFACERS • FLEXIBLE SHAFT MACHINES

SOLD ONLY THROUGH *TRAINED* INDUSTRIAL DISTRIBUTORS



Almost Unlimited Application

WALKER-TURNER Drill Heads may be used for almost unlimited applications. The illustration left shows a set-up in daily use performing as a radial drill of extra large capacity.

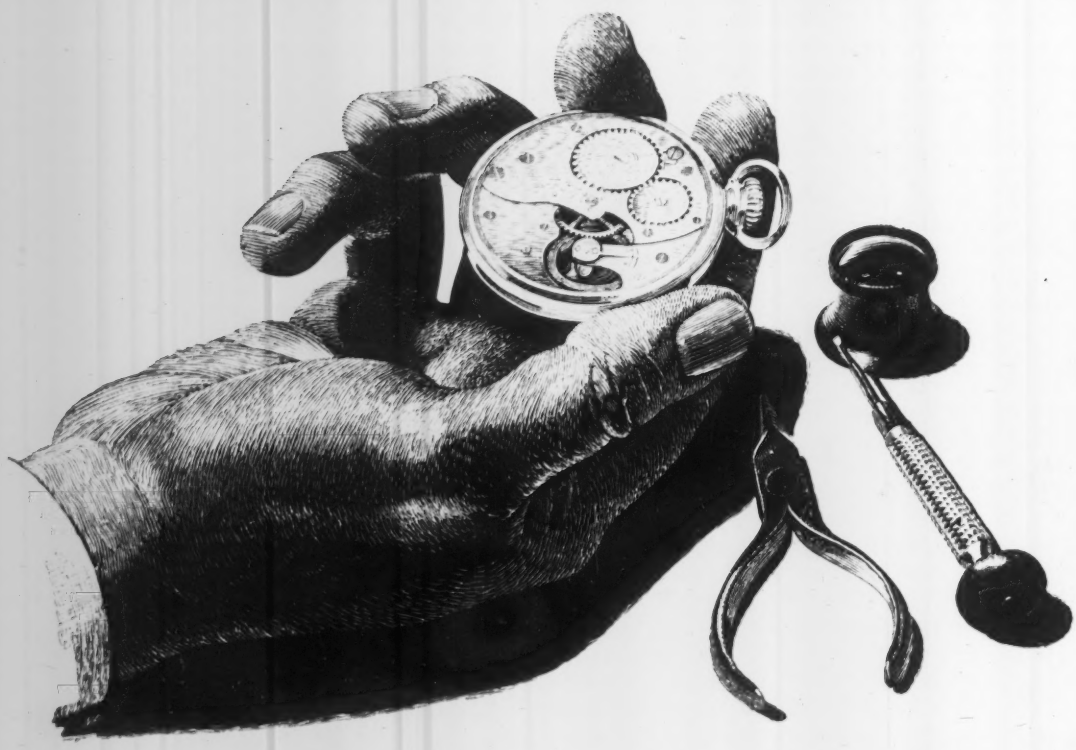
Horizontal and angular mountings—in single units or in batteries—are making substantial savings for hundreds of manufacturers.

For complete information, write your name and address in the margin of page.

Use this space

to write for full details and specifications.
Walker-Turner Division, Kearney & Trecker Corp.
Dept. S9, Plainfield, N. J.

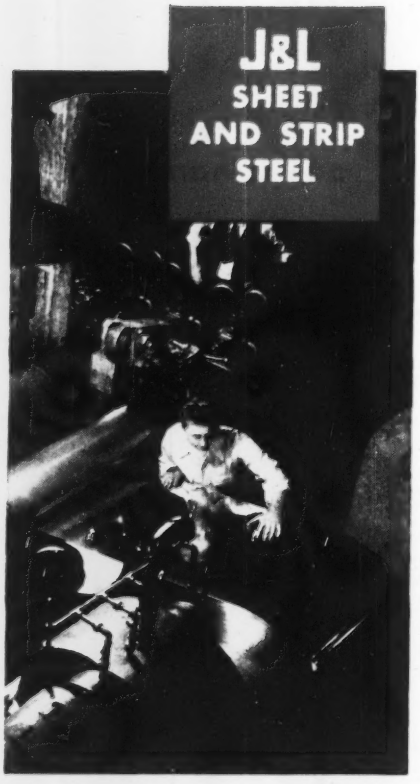
(Please write your name and address in margin of page)



Like the works of a fine watch . . .

STEELMAKING, TOO, REQUIRES THE UTMOST PRECISION

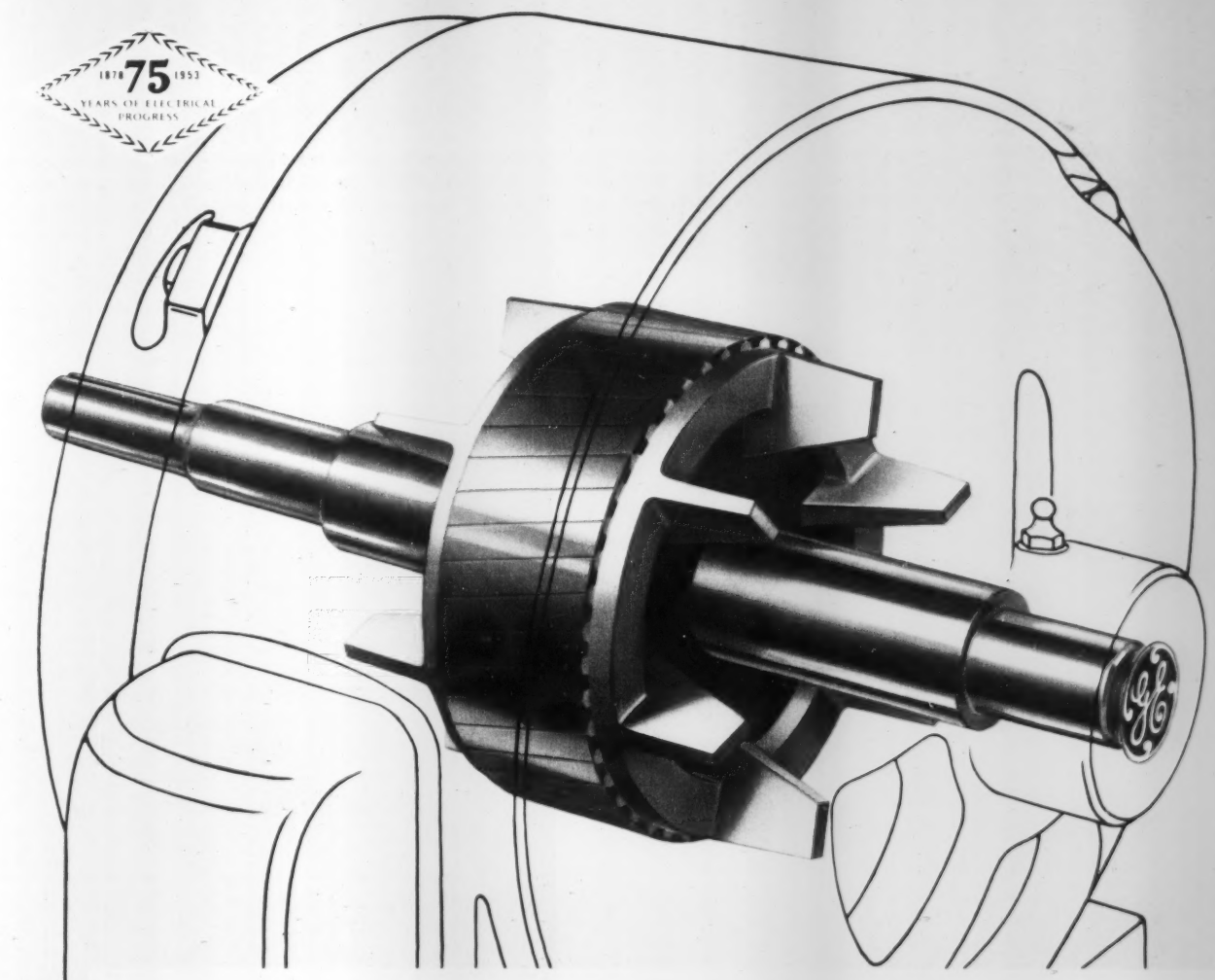
Whatever your requirements for formability, uniformity, or drawing qualities, you'll find J&L Sheet & Strip . . . accurately and faithfully produced to meet your specifications. Complete understanding of the end-use of the sheet or strip you order is a rigid requirement of J&L production. You can depend upon J&L products to fit your production line.



J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH

1878 75 1953
YEARS OF ELECTRICAL PROGRESS



Why rotors don't fail in G-E TRI CLAD motors

G-E pioneering and research developed and produced this one piece cast-aluminum rotor winding, which has virtually eliminated rotor failures in Tri-Clad motors.

Rotor is indestructible in service because the bars, end rings, and fans are a "one-piece" casting. No brazed joints, no fabricated fans to come apart.

Rotor inertia is reduced by the lightness of the aluminum, thus raising efficiency and allowing easier starting, stopping and reversing.

Rotor efficiency is higher, operating losses reduced, as the result of a special chemical treatment.

The motor runs cooler because the integrally cast fans dissipate heat faster.

Operation is smooth and quiet due to the dynamic balancing of the rotor which also reduces bearing wear and material fatigue.

Long rotor life is one more reason why G-E Tri-Clad motors last longer — give you more reliable service and greater operating economy.

Order Tri-Clad motors today from your nearby G-E representative. You'll find popular models in stock. General Electric Co., Schenectady 5, N. Y.

752-20

You can put your confidence in—

GENERAL ELECTRIC

When Nobody Knows the Answer

One of these days you may come face-to-face with a metal problem that does not seem to have an answer.

That is the time to think of these International Nickel Company metallurgists. They are constantly improving and modifying nickel alloys to meet new conditions. They are always ready to help you with specific problems involving metals for destructive service conditions.

Over the past 50 years, Inco has developed a family of metals for hundreds of different applications. In one branch of the family, for example, is a group of heat-resisting alloys—Inconel®, Inconel "X"®, the Nimonic® Alloys and Incoloy®—all now important in high temperature work.

Elsewhere on the family tree, you will find other alloys—each with certain special characteristics. Often, there is a better-than-even chance that one of Inco's alloys offers exactly the properties you are looking for.

Of course, this does not mean that somebody at Inco can dip into the files and come up with a pat answer to every new problem. All the answers have not been found yet. But a tremendous amount of research has been done, and you can probably benefit in one way or another from it.

When nobody knows the answer, Inco's metallurgists keep going until they have investigated all possible metals and alloys that might do the job. In fact, the men in Inco's Technical Service (and in their Corrosion Engineering and High Temperature Engineering Services, as well) have one primary goal: to help you determine whether an Inco Nickel Alloy or some *other* metal will serve your purpose best.

No matter what your metal-selection problem may be, all the technical facilities of Inco are available to help you solve it. There is no charge, no obligation of any kind. For prompt technical help whenever you need information about metals, all you have to do is get in touch with: "Technical Service,"

THE INTERNATIONAL NICKEL CO., INC.
67 Wall Street, New York 5, N. Y.

NICKEL ALLOYS (INCO TRADE MARK)

MONEL® • "R"® MONEL • "K"® MONEL • "KR"® MONEL
"S"® MONEL • INCONEL® • INCONEL "X"® • INCONEL "W"® • INCOLOY®
NIMONIC® ALLOYS • NICKEL • LOW CARBON NICKEL • DURANICKEL®

STEEL
September 21, 1953

Metalworking Outlook

In a Month: Decision on Aluminum

The Office of Defense Mobilization won't reach a decision on the proposed third round of aluminum expansion for another month. The decision will depend on what the Defense department thinks necessary for the mobilization base. ODM's decision is not contingent upon and may be made before the District Court in New York rules on whether Aluminum Co. of America will be allowed to carry out its contract to buy 600,000 tons of Canadian aluminum.

Dynamic Growth

Although ODM is considering closing out some 150 of the 233 goals in its mobilization expansion program, such action will have significance only for the moment. The expansion program will be reviewed periodically so that any goal closed out now might be reopened later if the circumstances required it.

Conformity, Plus

The majority of today's new plants are going into zoned areas, according to a preliminary study by Society of Industrial Realtors of 137 factories built within the last five years. Some 90 per cent of the new facilities surveyed are one story; nearly 60 per cent have only one building. The structures more than meet local zoning regulations: More than two-thirds occupy 25 per cent or less of their sites; more than half are set back 99 feet or further from streets—a voluntary distance much greater than any usually required.

West Germany Moves In

West German capital is being exported. The nation's currency exchange regulations have been relaxed now that it has a growing and favorable foreign trade balance. Canada gets 27 German branch plants, with 12 in Newfoundland, six each in Quebec and Ontario, two in Manitoba and one in British Columbia. One source for German funds is the $15 million that American soldiers are spending monthly in Germany.

Rural Market: Vigorous

Farm equipment sales are in the doldrums now, but don't underestimate the vigor of the rural market. An indication of that strength is the fact that the 4-millionth rural consumer began receiving electricity from REA-financed power systems during the week of Sept. 14. With the program now in its 19th year, about 90 per cent of all U.S. farms today are served by electricity. They're all potential customers for electrically driven equipment.

Defense Department Project

The Defense department is pushing a plan that would require all suppliers of steel and nonferrous shapes to the armed services to identify

Technical Outlook—p. 127 The Market Outlook—p. 199

their product with a uniform marking system beginning sometime in 1954. The Defense department's concept of a marking system to identify alloy steels has been broadened to include all rolled metal shapes—ferrous and nonferrous, alloy and nonalloy. Defense department's Office of Standardization is starting to prepare a proposed military marking standard that will probably use a printing, rather than a color, system.

What's in a Name?

The name changes again. The agency that is to succeed NPA as administrator for the remaining controls on materials will be called Business & Defense Services Administration, not Business Services Defense Administration as once planned. Besides NPA, BDSA will take over the Commerce department's existing Offices of Distribution and Domestic Commerce. Activities of Commerce's Offices of Business Economics and International Trade will remain separate from BDSA, but they will be expanded.

A Divorce Is Sought

Watch for a union drive to divorce industrial pensions from Social Security. Under the revised Ford Motor Co. formula, maximum benefits now are independent of Social Security, points out Edwin Shields Hewitt & Associates, a management organization in Libertyville, Ill. The new union attitude stems partly from the fact that, when Social Security payments were increased in 1952, many employees did not receive the additional benefits. Most retirement plans now specify a scale of benefits "including Social Security payments."

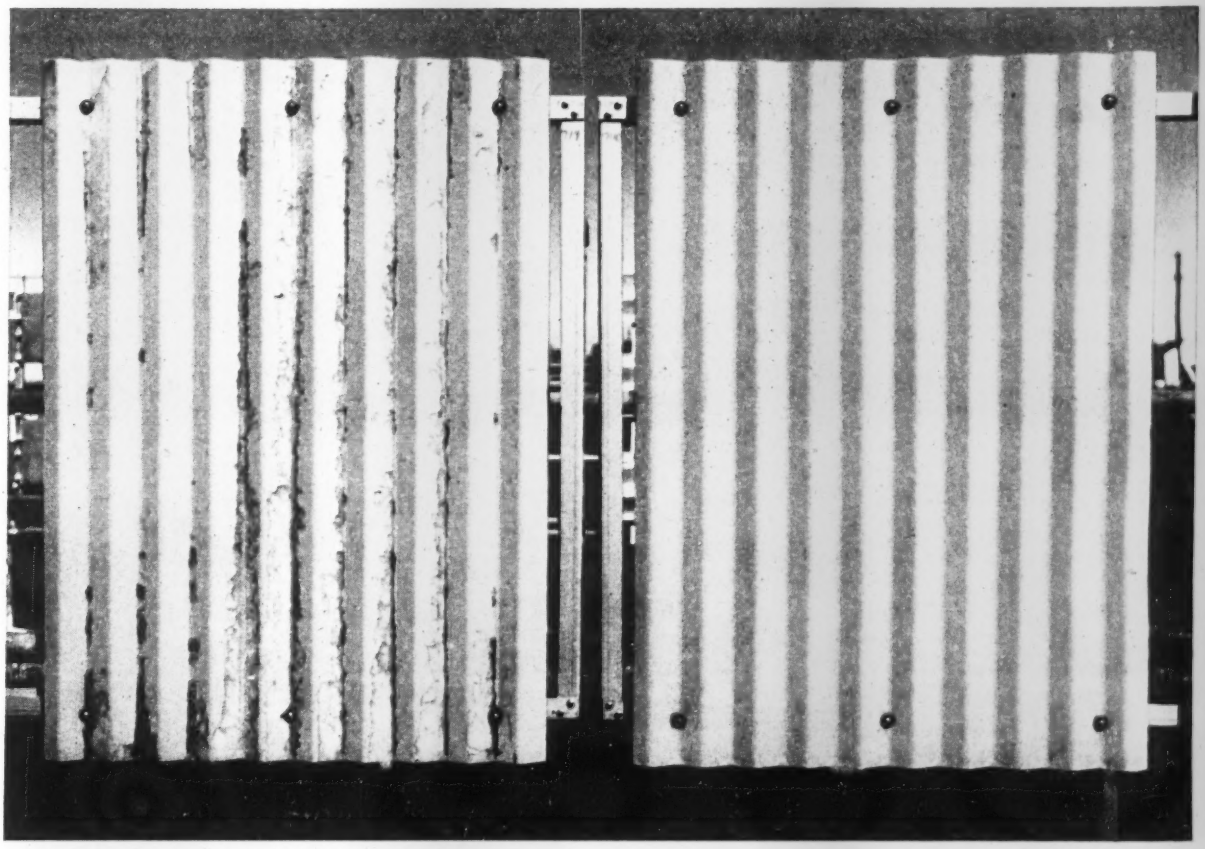
Straws in the Wind

The 1954 Nash will offer as optional equipment an air conditioning device reportedly designed by Kelvinator along entirely new lines . . . Monroe Auto Equipment Co., which this year announced a new power steering unit of the linkage type, reports that the device is being delivered to six automakers for use on 11 1954 models . . . The $400 million to $500 million cutback by the Air Force in jet and piston engine orders is in line with cutbacks in planned plane production . . . The Navy will let contracts for construction of 165 vessels, including a third Forrestal-class supercarrier, 14 destroyers, minesweepers and other ships and 150 landing craft . . . Direct nonmilitary aid from the U.S. to foreign countries is nearing an end, says Commerce Secretary Sinclair Weeks.

This Week in Metalworking

We are in the midst of an inventory shake-out, called "healthy" by most economists (p. 85) . . . Watch for a market by 1960 for 200,000 heat pumps annually (p. 86) . . . Prospects are shiny for metal foil manufacturers (p. 87) . . . Ohio Hoist & Mfg. Co. fights back in a labor dispute (p. 88) . . . The U.S. defense equipment disposal policy will be outlined soon (p. 89) . . . Sales dip, but there are no tears from machine tool distributors (p. 90) . . . Aircraft manufacturers are making progress in a program to control costs (p. 91) . . . Despite a few big orders, freight car production is sluggish (p. 96).

After two years' exposure in a corrosion-test yard, this is how two painted samples looked. The corrugated 28" x 36" sample at the left is regular untreated galvanized steel. Note how the paint has flaked and peeled away from the zinc coating over parts of the entire panel. Sample at the right is Armco ZINCGRIP PAINTGRIP. Here the paint is just as smooth and beautiful as the day it was put on. No cracking or flaking of the paint occurred.



Special zinc-coated steel DOUBLES PAINT LIFE

Tests show paint life on special zinc-coated Armco ZINCGRIP PAINTGRIP sheets is at least *several times longer* than on regular galvanized surfaces or uncoated steel.

The reason is a mill applied Bonderized finish on top of the zinc coating. This finish takes paint immediately and helps preserve it. No acid etching or surface treating of any kind is needed.

With ZINCGRIP PAINTGRIP you give your painted products and equipment these profit-and-sales advantages: *Lower finishing costs, longer lasting and more attractive products, and more satisfied customers.*

Besides assuring longer paint life, Armco ZINCGRIP PAINTGRIP provides unbroken zinc protection for sharply curved sections as well as flat parts. Blanks can be formed or drawn without flaking or peeling of the special zinc coating. This coating takes as severe a draw as the base metal.

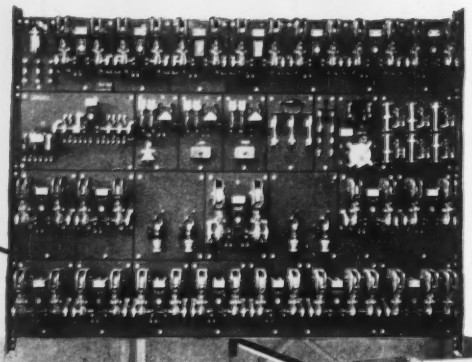
Maybe you can profit from this double-edged sales mover and shop saver. Armco ZINCGRIP PAINTGRIP has a record of more than twelve years in proved service. It was the *first* hot-dip zinc coated sheet and strip steel that could be severely formed and drawn and painted immediately without pre-treatment.

ARMCO STEEL CORPORATION

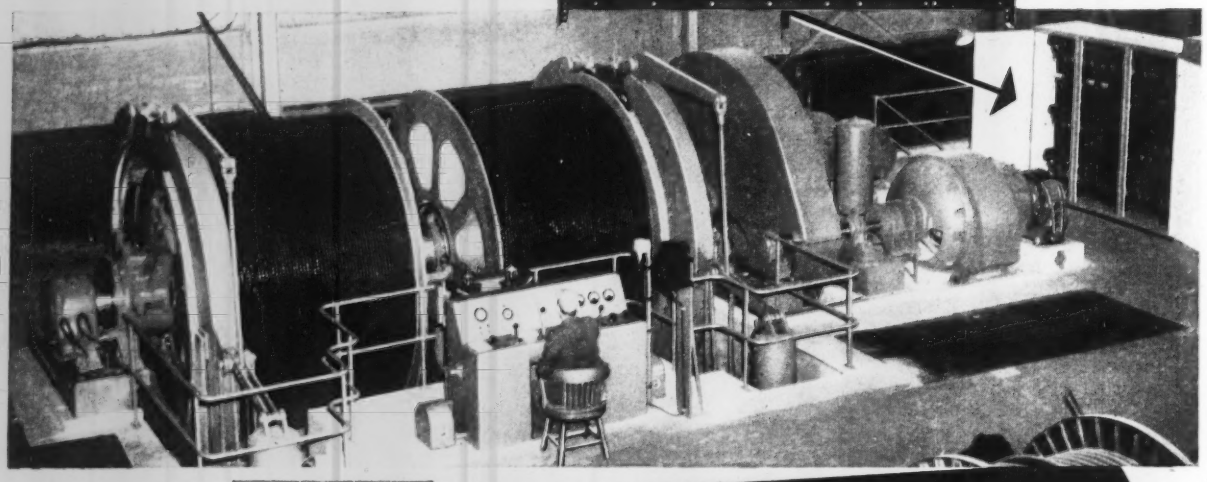
3603 Curtis Street, Middletown, Ohio • Export: The Armco International Corporation

ARMCO

a job for EC&M Frequency Relay Control...



Installation in northern New Jersey of Nordberg balanced double cage slope hoist operated by two wound - rotor motors under EC&M Frequency Relay Magnetic Control.



Cage Creeps Up Or Down—Runs at Full Speed — Is Slowed Down From Operator's Master Switch.

PERFECT CONTROL

The passengers enjoy a velvet-smooth ride on this mine-hoist. EC&M Frequency Relay Control permits adjusting the torque of the two 200 hp, 440-volt wound rotor induction motors to cause the cage to creep, to run at full speed, or to operate at intermediate reduced speeds.

The operator's multi-speed-point EC&M Cam Master Switch makes speed selection quick and sure.

EC&M Frequency Relays automatically switch motor connections to maintain safe operation under all conditions.

Because of the highly efficient operation throughout the past five years of a similar hoist equipped with EC&M Frequency Relay Control, the user specified EC&M Control for this latest hoist installation. If you have a hoist problem, it will pay you to look into EC&M Control.

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2. Cushioned acceleration during hoisting and lowering.
3. Slowdown by motors—EC&M Type WB Brakes set and hold the load.
4. Slow speed for rope inspection—about 12% of normal hoisting speed.

No. 28 ACCELERATOR Bulletin describes this EC&M hoist control system. Write for your copy.

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Painful Lesson

Few thoughtful persons were surprised when the resignation of Secretary of Labor Martin Durkin brought about the first break in President Eisenhower's cabinet within eight months of the time his new administration assumed office. Events have proved that the appointment of this Democratic labor union leader not only was a deplorable mistake but also was as "incredible" as the late Senator Taft intuitively described it.

Whoever sold the President on appointing Mr. Durkin probably did so on the theory that it would win support for the administration from labor union leaders and more votes from the rank and file of union members. This reasoning was faulty on two counts. First, Mr. Durkin was not influential enough to win support from top union chieftains for anything. Secondly, union members do not vote according to the wishes of their union leaders—as attested by the elections in 1950 and 1952.

Durkin's break with President Eisenhower came when the latter refused to go along with the 19 amendments to the Taft-Hartley Act which Durkin had proposed. Most of these amendments were favorable to union leaders. Congress—even more critical of union demands than the new administration—would not adopt them.

Right here it is well to remind ourselves how Congress has voted on labor legislation. The Wagner Act was passed in 1935 with a vote of 63 to 12 in the Senate and with no vote recorded in the House. In 1947, when Congress felt the Wagner Act was too one-sided in favor of unions, the Senate voted for the corrective Taft-Hartley Act 68 to 24 and the House concurred 320 to 79. President Truman vetoed the bill, whereupon the House overrode the veto 331 to 83 and the Senate smacked it 68 to 25. The cold fact is that Congress cast more affirmative votes for Taft-Hartley than for Wagner.

In the public interest, it is important that no group be given too much power. Union leaders already have more than they need. Millions of citizens know this and will vote accordingly. Congress knows it. Taft knew it. Eisenhower advisers now should recognize it.

E. L. Shaner

EDITOR-IN-CHIEF

PLANTS ARE DIFFERENT: In connection with the ever-present problem of labor relations, it is an unfortunate fact that under conditions existing today, a small or newly organized metalworking establishment may encounter critical union problems even before it is prepared to deal with them effectively. In this issue (p. 88) our editors present a case study

of a small company whose union problem probably is typical of hundreds of other companies.

This and other cases emphasize the fact that a union contract agreed upon by several large companies immediately becomes the pattern for all other companies in the same or affiliated categories. Often this is terrifically unfair, because the conditions of employment, cost of living, etc. vary so drastically.

The big opportunity for improvement in labor relations in the next decade lies in the largely unexplored field of patterning union contracts to the peculiar needs of specific companies. The present idea that all companies — large and small — present a uniform target for union exploitation, is unrealistic.

* * *

GERMANY VEERS RIGHT: Results of the recent election in Germany are of considerable interest to Americans and others who have a stake in the ultimate status of Western Europe. There are several reasons why the really phenomenal victory of Chancellor Adenauer are pertinent to American interests.

One is that the absolute majority of Adenauer, in addition to the rather pitiful showing of the splinter parties, places West Germany in the enviable status of a two-party system republic. It is a long time since a German leader has been able to rule without the aid of a coalition government.

A second point, and one that may become extremely important in world-wide commerce, is that the Adenauer victory means promotion of the free enterprise system, a rejection of cartelization and a shunning of socialistic proposals.

* * *

STARTED ABOUT EVEN: Last week 335 motor vehicles of early make journeyed from Cleveland to Columbus to Toledo to Detroit in the 1953 version of the annual Glidden tour. The cars in the tour represented about 90 of the nearly 2000 makes that have been introduced since the first automobile was built.

As one viewed these spick-and-span old timers, among which was a liberal sprinkling of European models, one was prompted to ask why the United States has outdistanced other nations in the output of motor vehicles by such a large margin. At or near the turn of the century half a dozen nations were on a more or less equal footing in automobile production. As a matter of fact, France turned out more cars than the United States for a number of years. Today automobile registrations in the United States are roughly two and one-half times the number of registrations in all other countries of the world combined. Production at six million cars annually far exceeds that of any other country.

* * *

MASS BUYING POWER: Readers doubtless can think up dozens of good reasons why the United States has gained this tremendous lead in the production and use of automobiles. Among them are the ingenuity of manufacturers in developing mass production and the clever co-operative achievement of engineers, designers and salesmen in successfully inducing automobile owners to trade in old models for new models at increasingly frequent intervals.

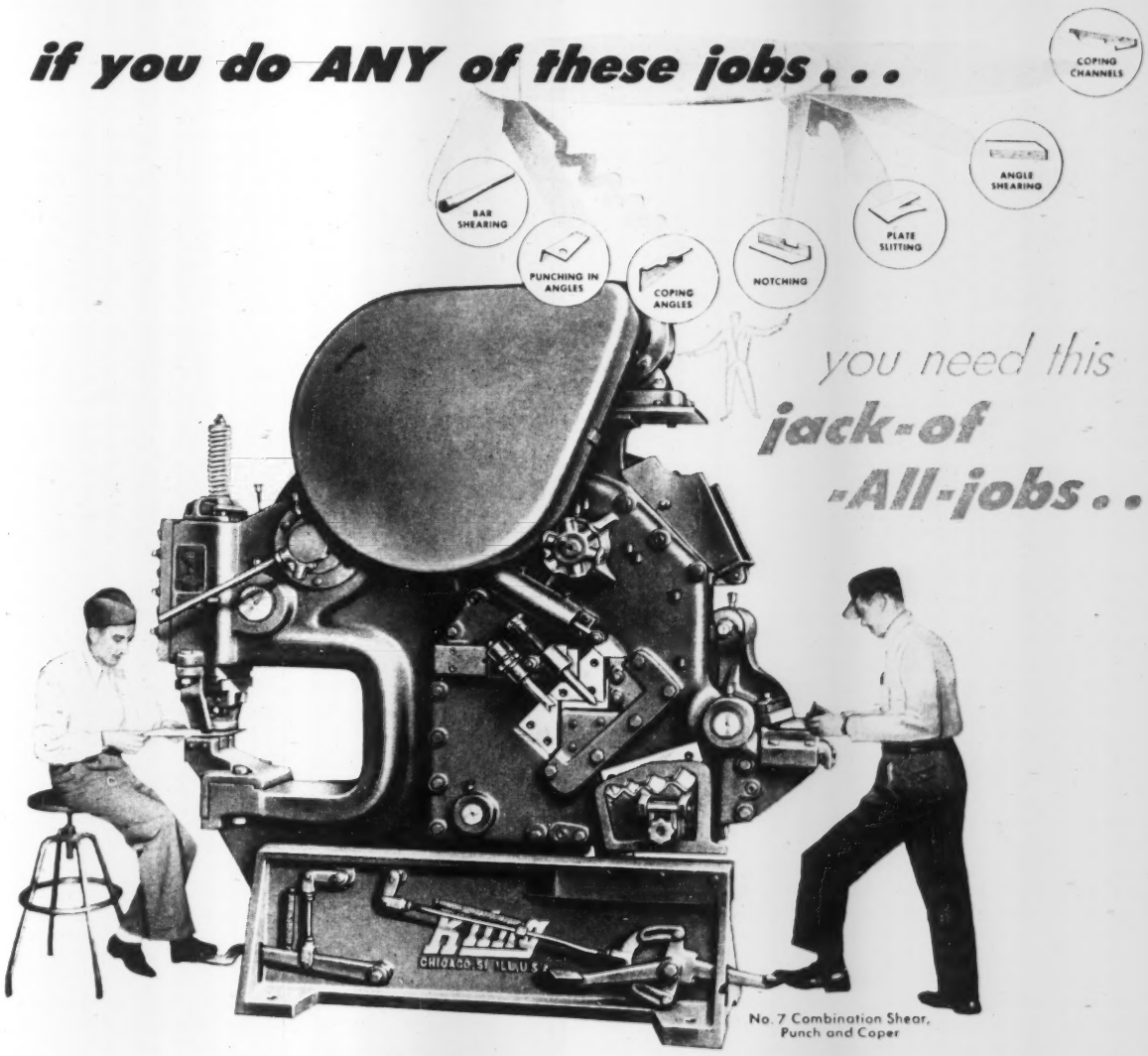
But beyond these and similar reasons is the fundamental fact that buying power is more widely distributed in our nation than in any other large country. This broad distribution of buying power makes for mass consumption, without which mass production would be futile. Six or seven large nations could do easily what has been done in the United States if the people in those nations were willing to work toward a wider distribution of buying power.

* * *

WHERE WE ARE WEAK: Christy A. Wilkin, vice president of research and engineering, Rockwell Mfg. Co., has returned from a three-month tour of European industrial centers (p. 95) with a significant observation concerning skilled manpower. He reports that "Europe is guaranteeing for itself a permanent reservoir of highly trained machinists and tool experts through its apprentice system." He found many plants training from 10 to 500 apprentices from 14 to 17 years of age.

American manufacturers will do well to note this tremendously important development in Europe and to do something immediately to improve apprenticeship in the United States. In many metalworking establishments too few apprentices are being trained and frequently the training is not as good as it should be. Today apprenticeship training is one of the weakest features of American manufacturing.

if you do ANY of these jobs . . .



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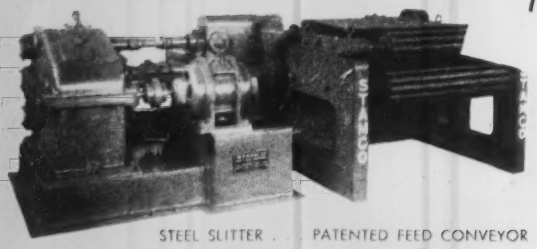
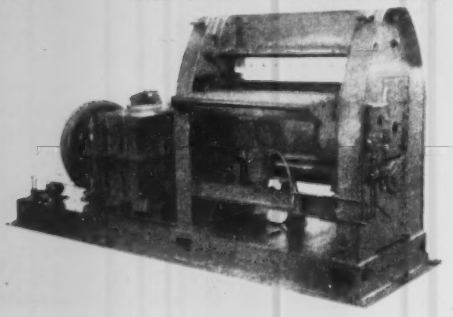
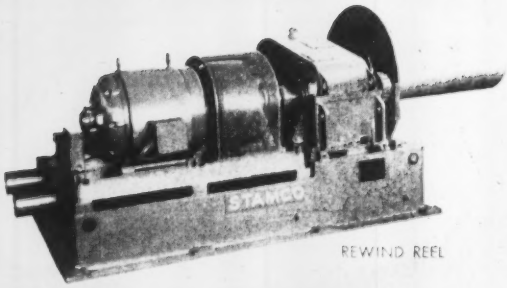


STEEL SLITTER . . PATENTED FEED CONVEYOR



UP-CUT SHEAR



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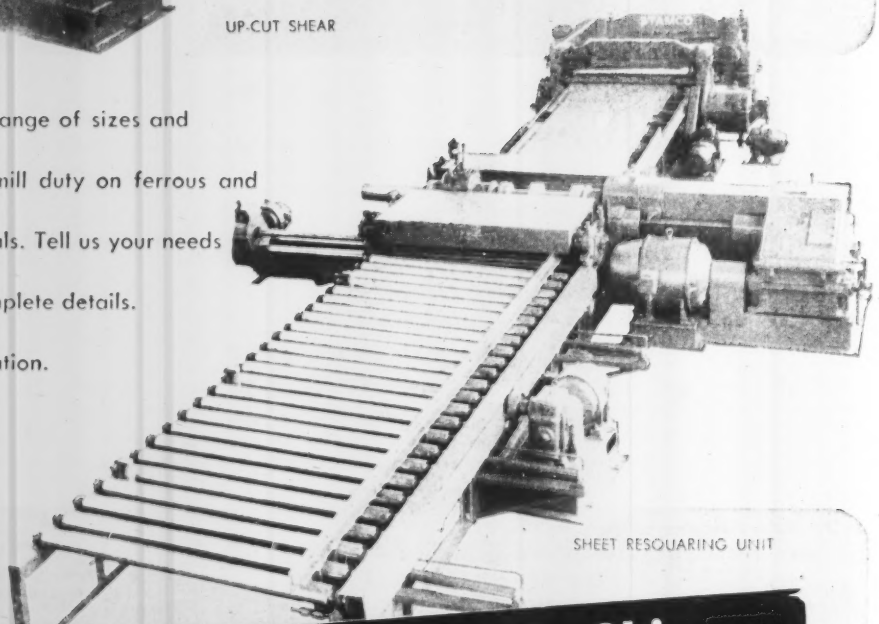


SHEET RESQUARING UNIT

STAMCO, Inc., New Bremen, Ohio

Inventory Shake-outs Helping Industry to Gain Stable Footing

Industry is reducing its stocks. The move is orderly, moderate and healthy. It doesn't look to be as severe as the 1949 adjustment

THE NATION'S economy is in the midst of an inventory shake-out.

Thus far, it shows no signs of being as severe as the 1949 inventory adjustments which led to a mild recession.

Optimistic — The consensus among business leaders interviewed by STEEL is: "This is a healthy development, long overdue. It's a result of better materials supplies. Purchasing agents are realizing that they no longer need to stock the volume they held during the shortages as insurance."

In February, 1949, the month with the highest inventories for that year, durable goods manufacturers had stocks worth $16.0 billion. That was 2.2 times their sales for that month of $7.3 billion. In November, the month with the lowest inventories for 1949, durable goods manufacturers had stocks worth $13.2 billion. That was only 2.0 times their sales for that month of $6.6 billion. In July, 1953, the latest month for which figures are available, durable goods inventories reached $26.0 billion, 2.1 times the $12.2 billion in sales.

Trend Is Down—That July figure is not alarming; in fact, the stock-sales ratio is still a little under the July, 1952, figure. But indications are that durable goods inventories have declined steadily since July, despite consumer durables, which have gained slightly because of heavy auto production.

The Purchasing Agents Association of Chicago in its August survey says: "Shrinking inventories are indicative of a general conservatism resulting from high prices, a drop in unfilled orders of scheduled business, faster vendor performance and good production." A survey by National Industrial Conference Board of 189 manufacturers regarding second-half prospects said: "Almost half the firms expect to reduce inventories in relation to sales during the second half, compared with only a fifth which indicate a relative rise."

Raw Materials First—A STEEL check on the situation indicates that the adjustment is starting in an orderly way, at the beginning in metals and raw materials. Foundries are frequently cutting down on stocks of coke and pig iron. Some in the Chicago area are whittling down to as low as 10-12 days' supplies. Steel salesmen also report their customers show an increasing trend to live off their inventories. Right now about as much steel as ever is going into durables, but more of it than formerly is coming from stocks rather than directly from the mills.

The adjustments are also going on in components, although not to such a marked extent as in metals and raw materials. Preliminary reports on STEEL's quarterly survey of components (to appear Oct. 5) indicate stocks are dropping. Most of the respondents predict even lower inventories in the next few months. For consumer durables, inventories now are probably equal to or slightly above July levels. But watch for them to decline.

"There's an orderliness to these adjustments that I like," says an Ohio executive. "It augurs well for the future."

Good Dividends Continue

Publicly reported corporate cash dividend payments of $4810 million during the first eight months of 1953 were 4 per cent above the same period last year, the Office of Business Economics says.

Manufacturing payments of $2439 million showed a rise of only 1 per cent, while nonmanufacturing returns increased 8 per cent. The manufacturing gain was largely in the machinery and transportation equipment industries, which respectively climbed 3.2 per cent and 20 per cent. Higher dividend rates were chiefly responsible for the expansion in both.

During August, dividend payments of $221 million were 4.5 per cent less than in the same month a year ago. The decline centered in manufacturing where disbursements were 17 per cent less due to the shift forward of many payment dates. Increased railroad checks were the main reason for the 5.5 per cent increase in nonmanufacturing.

Push-Button Weather from Heat Pumps

Westinghouse has joined the handful of firms making a unit that both heats and cools. Some 200,000 yearly may be sold by 1960—if the price is under $2000

YEAR-ROUND air conditioning units may supplant separate cooling and heating installations in favorable climatic areas. So says the air conditioning division of Westinghouse Electric Corp., Pittsburgh, on introducing its new heat pump.

Advantages of the new Westinghouse all-electric heat pump over standard heating and cooling units are that it requires no carbonaceous fuel or water and is more compact. As W. B. Cott, sales manager of the air conditioning division at Hyde Park, Mass., states, "We feel we have developed the most complete year-round air conditioning package yet offered to the public."

New Units—Westinghouse enters the heat pump field with two models, whose production is now beginning. The HP-3 (three horsepower) model occupies ten square feet of floor space, is six feet high and weighs 1400 pounds. HP-5 is a five-horsepower model, proportionately larger than HP-3.

The HP-3 unit has 36,000 btu's per hour capacity for summer cooling, 30,000 btu's per hour capacity for heating in winter, and 1200 cubic feet per minute summer air circulation. Intended for a five or six-room house, it will heat to 70 degrees in winter with an outside temperature of 35 degrees. In summer it will cool to 72 degrees, with an outside temperature of 95 degrees.

Larger Size — The five-hp unit has 60,000 btu's per hour summer cooling capacity and 50,000 btu's per hour warming capacity for winter. Summer air circulation is 2000 cubic feet per minute. This unit is intended for a six to eight-room house, with the same temperature limitations as in the smaller model.

Extremely cold weather, prevailing architecture and prices well above those for the Westinghouse air conditioner alone may limit the heat pump's acceptance. For best results, Westinghouse recommends use in areas where the low temperature range is not extreme nor of long duration.

Cost—Installed price of the two models is $2300 for HP-3 and about $3300 for the HP-5 model. Operating costs of the new unit are lower than those for any of the ordinary types of cooling equipment, Westinghouse officials say. In tests in an eight-room Lynchburg, Va., house, operational cost for one year averaged $33.10 per month at the local 1½-cents-per-kilowatt-hour rate. In Miami, Fla., with similar rates, operational cost averaged $10.50 per month. Here, cooling was the prime requisite.

Westinghouse

HOME HEAT PUMPS
. . . from ancient heat, modern comfort

The self-contained heat pump fits best in the basement or utility room. Installation consists of connecting electric power lines, a condensate drain and supply and return air ducts. Westinghouse expects most sales to be in new installations, with renovation of existing ductwork advisable only in bungalow-type houses, says Mr. Cott. In one-story houses, ductwork can be installed easily below the roof or below the floor.

Automatic Operation—"One reason for successful operation of the heat pump," Mr. Cott says, "is its original design of a new single metering tube. This automatically switches the unit from heating to cooling."

A single three-stage room thermostat regulates the pumps. There is a five-degree differential between the heating and cooling stage and a two-degree differential between normal heating and the booster heat stage. A thermostat set at 74 degrees would control the heating stage at this temperature. Booster heat would come on at 72 degrees and cooling would begin at 79 degrees.

Experimental—Because of the cost and commercial youthfulness of the heat pump, not many companies are yet in the field. Westinghouse has just gone into commercial production. General Electric Co. has been marketing packaged home units since early in 1952. A few other firms, including Typhoon Air Conditioning Co. Inc., Brooklyn, N. Y.; Muncie Gear Works Inc., Muncie, Ind.; and Acme Industries Inc., Jackson, Mich., also produce the packaged unit. Other companies, such as Trane Co., La Crosse, Wis., build it into custom installations.

GE Vice President Clarence H. Linder predicts that 200,000 packaged heat pumps will be sold annually by 1960 at an average installed price of less than $2000.

Something New in Plows

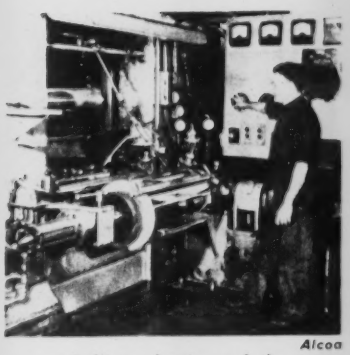
American and Canadian manufacturers interested in the revolutionary new bulldozer plow developed and now in production in Norway will have a chance to see this machine in action at the International Plowing Match and Farm Machinery Demonstration to be held Oct. 6-9 at Cobourg, Ontario.

Attached to the front of a 15-ton bulldozer, the plow digs furrows 3 feet wide and over 2 feet deep in rocky virgin soil. "Large boulders, caught by sharp prongs made of armor steel, are brought to the surface with the greatest of ease," reports the Norwegian Information Service, Washington. After the demonstration, the codesigner, Ragnvald Skjarpe, plans to visit agricultural implement builders in Minneapolis and Chicago.

Inspecting aluminum foil

Future Glitters For Metal Foil

Metal foil, and today that means mostly aluminum foil, is bounding ahead with high output and new applications



Rolling aluminum foil

MANY METALWORKING products are now going into the battle for sales in a shining coat of protective armor—metal foil.

Until World War II, foil was considered the nearly exclusive property of the food packaging industry. And a growing host of food products are being packaged that way: Candy, gum, butter, cheese, frozen foods, and cereals, not to mention other products like cigarets, cigars, even complete full-course dinners — precooked and merely warmed up when ready for use.

Discovery—But, in World War II, metalworking manufacturers discovered metal foil for their own products as foil was written into military packaging specs. Now, engines, bearings and replacement parts are going to the commercial market in very thin coats of metal.

Aluminum foil leads by a wide margin of usage over combination lead-tin and tin foils. The ratio is probably 70-20-10. This year, aluminum foil output will exceed the 100-million-pound mark, up nearly 15 million pounds from 1952's 85,402,000 pounds. Aluminum Association members, representing more than 90 per cent of total aluminum foil output, turned out 55,702,000 pounds of foil in the first half, 1953. In addition, some 8 or 9 million pounds are produced annually by nonmembers, including some tobacco companies.

Wrap It Up—That's big production when you consider one pound of aluminum foil of 0.0005-inch thickness will cover an area of 142 square feet. The most commonly used gages for packaging run from 0.0015-in. to 0.00035-in.

Lead and tin foils are used largely in special fields where the nature of the produce packaged requires protection of those products by lead or tin or where the product is allergic to aluminum. Johnson Foil Co., St. Louis, makes a solder foil, a combination of lead and tin, which is used in electrical equipment. A layer of foil is laid down between two parts and, when heat is applied, a quick, evenly soldered joint results.

Pace Setter—But in most markets, aluminum foil has taken the pace-setting position because it's cheaper by the time it reaches the end-product and it is becoming increasingly available.

Though packaging takes the lion's share of output now, usage of aluminum foil is in the process of metamorphosis into a manufacturing material. Conditions for the change have been growing since industry really got its hands on the skinny, shiny, stuff during World War II. Metalworking has become educated to aluminum foil's properties. It's a moisture barrier. It's greaseproof, nonsorptive, shrinkproof, corrosion resistant, nonaging and strong. It reflects radiant heat, yet passes direct heat rapidly. It's an electrical conductor. It can be lacquered, laminated, printed upon, embossed and readily formed. Colored aluminum foil can be drawn without marring. Together with this process of education has been increased production of aluminum foil and better accessibility.

Drawing Nearer—While there are still relatively few basic producers of foil, there's a growing number of "converters" in the country, possibly a double handful now, and both types of producers are stepping up production goals. That 55.7-million-pound output in the first half of this year, for example, represents a 52 per cent increase over last year's first half production.

What changes are these conditions bringing in aluminum foil usage? The bright metal is turning up in all sorts of new industrial applications: As lithographic printing plates, as gage needles, as roofing and wall insulation, as capacitors and diaphragms in radios and TV, in appliances, hospital equipment, as gaskets and shims and in dies for certain plastic-forming operations. Even the possibilities of more aluminum being used in automobiles are partially based on foil applications.

With more industrial applications like those above appearing literally every week, there's no reason to ask what has put the glitter in industry's eye it's aluminum foil.

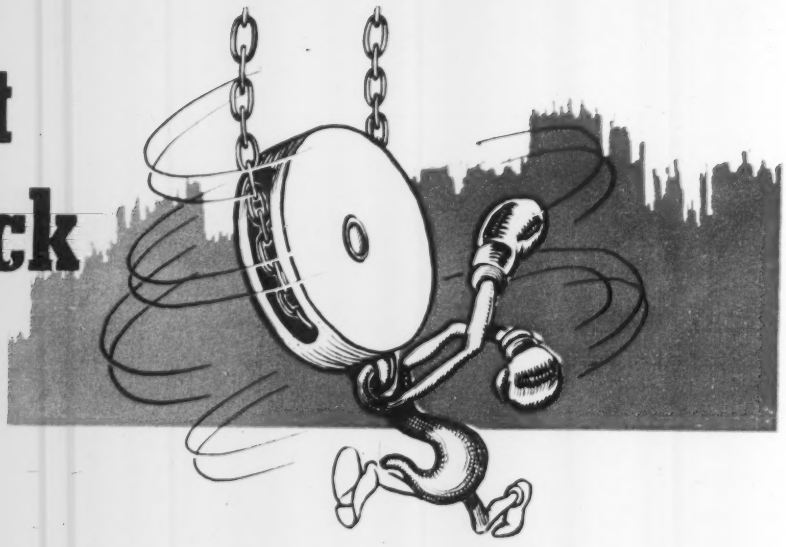
Jeeps Made in Japan

Some Willys Jeeps may soon be marked "Made in Japan," following an agreement between Willys-Overland Export Corp. and Mitsubishi Heavy Industries Reorganized Ltd.

Hickman Price Jr., president of the Willys export company, says, "The new agreement provides for progressive manufacture. Mitsubishi will rapidly develop the manufacture of its own parts to Willys' specification and is expected to reach 100 per cent Japanese material content in the near future."

Mitsubishi is establishing the manufacture of Willys Jeeps in its Nagoya plant about 175 miles from Tokyo. This plant, largest and most modern in the Orient according to Willys, has a floor space of 3,246,000 square feet.

Ohio Hoist Fights Back



WHAT SHOULD a small company do when faced by unreasonable demands from its union, a large international?

Ohio Hoist & Mfg. Co., Cleveland and Lisbon, O., encountered that problem. Here is a case study of what its management is going through to fight its way out of a corner. The situation is not uncommon; many other firms, mostly small, have been in the same predicament.

The Genesis — Ohio Hoist is a small company manufacturing hoists and other materials handling equipment. It's a young company which had operated at a loss as of last April. About that time seven of the firm's nine employees voted to organize, selecting the AFL's International Brotherhood of Blacksmiths, Drop Forgers and Helpers (commonly called the blacksmiths) to represent them.

Shortly after that affiliation the union approached the company, then a partnership headed by James W. Dickey, with a proposed contract containing many demands. All the terms were discussed. On many points both sides were in agreement. But many economic demands eventually made by the union were termed "fantastic" by management. It was explained that the company had been operating at a loss, but that prospects for future earnings, based on newly acquired contracts, were bright. Despite the attempted negotiations by management, the union refused to yield, and subsequent to Apr. 25, an impasse was reached between management and labor.

What To Do?—Mr. Dickey reports that one union official said: "If the firm cannot afford to pay higher wages, then it should close it does not deserve to be in business." The partners decided that their economic situation was such that they should stop operations rather than undergo a strike.

That might have been the end of the whole story, had it not been for civic leaders of Lisbon who urged the partners to reconsider their action and to keep a potentially prosperous business in the area. The partners did reconsider, and as a result, formed a new corporation, Ohio Hoist & Mfg. Co. Inc. The new corporation took over the assets of the old firm and reopened the Lisbon plant May 5. Reese Lewis, a former associate, was made president.

New Concept — The old Ohio Hoist had been primarily an assembly operation, with much of its work subcontracted. The new Ohio Hoist decided to do more of its own work and actually to become a manufacturer.

For a while after it reorganized, Ohio Hoist heard nothing from the union. But on May 28 that group lodged a charge with the National Labor Relations Board, saying Ohio Hoist refused to bargain, locked out illegally and was discriminatory. NLRB assigned the labor charge to its Sixth District (Cleveland) for investigation.

Timetable—In the meantime, on June 3, 11 of the 13 employees the company had at that time signed this petition: "We, the employees of Ohio Hoist & Mfg. Co. Inc., wish to have the International Brotherhood of Blacksmiths, Drop Forgers and Helpers (AFL) discontinue negotiating a union contract with this company."

After that development, the NLRB investigation began. The company objected to the way it had been conducted and reported it as "biased" to the labor board. A new examination was requested by the company. NLRB acknowledged the company charge, but the regional office stated that it believed the investigation to be fair and that it would make no further examination. A complaint was issued early in September based on that investigation.

Paradox—In the meantime—to complicate matters still further—the International Brotherhood of Boilermakers (AFL) advised the NLRB of its amalgamation with the original blacksmith union. The boilermakers were recognized by NLRB as the new bargaining agent. Thus, the situation now is that the principals in the dispute, the company and the union, are both different parties than when the whole thing started.

The new Ohio Hoist has had a face-to-face parley with the union; on July 25, both sides met but got nowhere. The company has been advised that legally it no longer need deal with the union, since the majority of its employees petitioned June 3 to have a non-union plant.

More To Come—But the dispute

is not over yet, because in October an NLRB examiner from Washington will hear the case, and then the national board will decide on whether Ohio Hoist has refused to bargain, locked out illegally or was discriminatory. The company believes it has a strong legal case.

In its economic battle, too, Ohio Hoist has more than held its own. It has jumped from nine employees in April to 53 now. And its order backlog is substantial. Company officials say: "We've discovered one thing in all this—it pays to assert an honest position."

Coal: The Decline Is Serious

Reeling from a better than 28 per cent production drop in the past six years, the coal industry particularly in the South is struggling to find a solution to check its market decline.

Joseph E. Moody, president, Southern Coal Producers' Association, recently outlined six steps which he believes necessary to get the industry out of its doldrums.

The Drop—Coal production, he related, has dropped from 630 millions tons in 1947 to an estimated 450 million tons this year. The market loss has come principally from railroads, heavy industry including electric utilities and home heating because of the inroads made by diesel oil, residual fuel oil and natural gas.

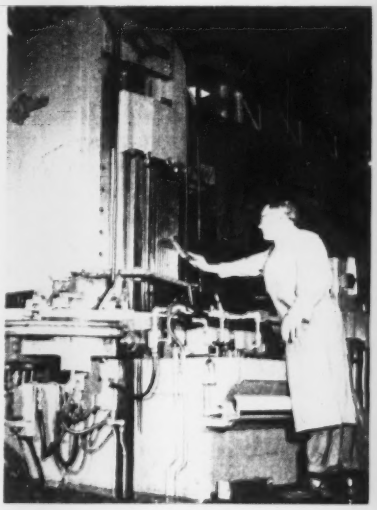
The Appeal—Calling upon all coal users, mine operators, miners, Congress and all concerned federal agencies to join in the effort to help the industry gain an economical footing again, Mr. Moody outlined the following program:

1. Stop cut rate dumping of foreign residual fuel oil. 2. Restrict use of natural gas to fields for which it is best suited and declare pipe lines common carriers. 3. Reduce exorbitant freight rates of coal, particularly in distant-to-market Southern mines. 4. Work out a program to reduce the per-ton cost of mining Southern coal. 5. Set up better research programs to find better means of coal utilization as well as new uses. 6. Bring to the attention of Congress the unequal depletion allowance provision of the tax law and press for a revision.

Equipment Disposal Policy Coming

The U. S. will soon outline its program for disposing of idle defense production equipment. Machine tool builders are fearful of some phases of the plan

BUILDERS of machine tools and related industrial equipment can abandon fears that they may be hurt by disposal of such government-owned capital goods, says



GOVERNMENT-OWNED TOOLS
. . . where do they go next?

Defense Mobilizer Arthur S. Flemming.

Machine tool builders, themselves, are not quite so hopeful. They believe the present administration will manage the disposal program wisely so as not to hurt manufacturers, but they fear what some new administration might do with the program.

Details Coming—Dr. Flemming says that Office of Defense Mobilization will issue a statement "within a week or ten days" to formalize the policy as to leasing and disposing of equipment. The policy would be based on the premise that to build up mobilization readiness defense production facilities must be kept intact so that they could be used without delay. A fundamental requirement is that the "packages" of equipment in defense plants must be kept complete. Hence, leasing of government-owned equipment for non-defense production will be permitted only in exceptional cases.

The forthcoming policy statement will define the circumstances under which such exceptions may be allowed. That aspect of the disposal program is the most touchy. Tool builders say that past history shows that exceptions often come to be the rule.

What About Sales?—As to disposal of machine tools and related equipment by sales, says Dr. Flemming, there will be such sales only if and when existing defense production lines become obsolete or if and when equipment clearly will be needed no longer. Such cases, he believes, will be even more rare than leasing. He claims the total volume leased or sold will be negligible.

Cutbacks in truck, tank, aircraft and ammunition production will not reduce the size of the mobilization base. All defense production facilities will be kept in standby. That applies not only to plants and facilities of prime contractors but also to those of subcontractors and sub-subcontractors. Ways and means of carrying out that program are being studied.

No Single Source—Dr. Flemming said that a careful investigation by him reveals no evidence of a trend towards a single source policy in the Department of Defense. There is a trend, he said to cut back on the number of sources for a particular item but this is accomplished by consideration for the necessity of keeping all sources available for use in case of need.

GM, Reo Share Army Contracts

General Motors Corp. has been awarded exclusively the Army's $200-million contract for the building of M48 medium gun tanks. It and Reo Motors Corp. will share in the Army's $146 million worth of awards for the production of two and one-half ton trucks during the latest contract period.

Chrysler Corp., which developed the Patton tank in conjunction

with Army Ordnance, did not receive that contract. General Motors did since its bid was 12 per cent lower. General Motors and Chrysler, the present contractors, will continue building these tanks until April, 1954, when Chrysler will place its machine tools in package storage adjacent to its Newark, Del., plant. Under a separate contract, Chrysler will remain as a vehicle design agency for the tank.

Although the bid of Reo Motors for the two and one-half ton trucks was slightly higher than GM's, Reo received an award which totaled $61 million. Studebaker, the only other present contractor, will finish its truck work before the end of the year.

Now, Iron from Nickel Ore

International Nickel Co. of Canada Ltd., announces construction plans on a $16-million plant to be the first operation to recover iron ore as a by-product from nickel ore under a new process.

The plant will be near Copper Cliff, Ont., and the first unit in an operation which will ultimately yield about a million tons of high-grade ore a year, in addition to nickel, from Sudbury ores.

Sales Dip, but No Tears

Despite a slight drop in machine tool sales, distributors see no cause for general pessimism

MACHINE TOOL SALES have dropped off some, but so far there's no cause for pessimism. That was the general opinion of machine tool dealers at the 29th annual meeting of the American Machine Tool Distributors' Association, White Sulphur Springs, W. Va.

"While our business is below last year's level, there are no signs of a drastic cut. Instead of a slump, it looks to us like a return to a more normal sales atmosphere." So said one midwestern dealer.

Still New Applications—Generally conceded: Heavy sales efforts must be expended on replacement of obsolete equipment. New job areas are still being created at a good clip, however, and most machine tool dealers are submitting a majority of their bids on these new jobs.

Eliot Janeway, consulting economist, highlighted this busy future for machine tools in his address to the group. He said, "Machine tools will continue to defy gloomy forecasts based on business cycle theories."

Guns and Butter—Mr. Janeway sees the machine tool cycle as one that goes from a gun boom to a butter boom rather than from boom to bust.

Among the signs indicating a continuing healthy atmosphere, Mr. Janeway gives these:

Machine tool customers who have been rationed out of the market are now under competitive pressure to improve product and to lower costs.

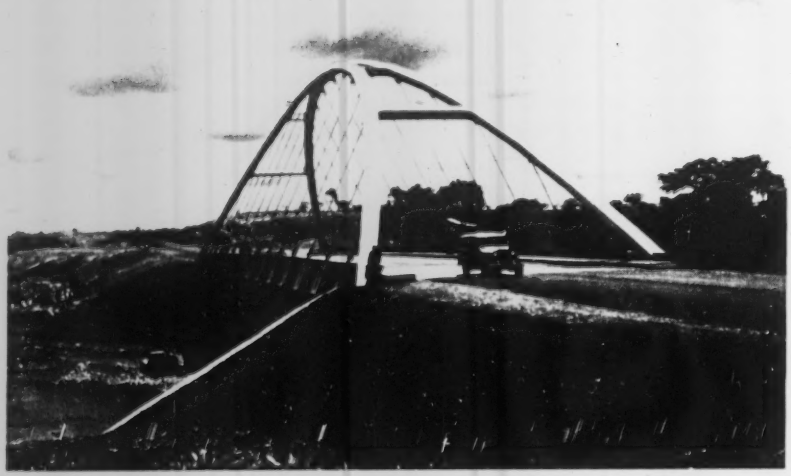
Livonia fire points up the need for dual source procurement. This will call, in some cases, for four plants producing similar products. Two will produce for civilian items and two for defense.

Favorable outlook for depreciation allowances plus discouraging outlook for tax allowances will work as a couple to keep machine tool demand high.

Russia's known ability to penetrate North America will result in more diversification of industry and facilities.

Much of the money spent thus far on the armament program has gone for research and development. More must be spent on the actual production of these defense items.

A backlog of new defense demand has accumulated and will probably show before too late in 1954.



Mexican Beauty from American Design

Inherent beauty of steel structures shows up dramatically in an all-welded steel bridge spanning the Rio Blanco river near Vera Cruz, Mexico. The graceful "basket-handle" design, conceived by Dr. Thomas C. Kavanagh, chairman of New York University's civil engineering department, won an award in the 1951 professional bridge design competition sponsored by the Lincoln Arc Welding Foundation, Cleveland. The bridge was constructed by Mexican engineer Camilo Piccone. Fabricator was Estructuras, S. de R.L., Monterrey, Mexico

Cleveland Foundry Sold

Controlling interest in the Lake City Malleable Co., Cleveland, has been purchased by the Machinery Terminals Inc., Akron, Sydney L. Albert, president of Machinery Terminals, announces. Purchase price which included the Columbus and Ashtabula plants of the company was "above $2 million."

New Steel Firm Organized

Formation of World Steel Corp. which plans to build a plant in the Chicago area for the manufacture of steel sheets is disclosed by Peter S. Pedersen, Chicago, president. The company has been incorporated in Delaware and has been qualified to do business in Illinois.

Economy Pays Plane Industry Dividend

How are your cost-cutting measures doing? Here are some the Aircraft Industries Association has adopted which amount to several million dollars in savings annually

A BIGGER BAG of groceries for a buck. The aircraft industry, like all of us trying to get more value from our dollars, is working on an economy program which is paying top-flight dividends for its procurement dollar.

The program, outlined in a booklet just released by the Aircraft Industries Association, delves into all phases for its economy measures—management, engineering, tooling, actual manufacture and materials.

Blood Pressure — Because most of the industry's production is in military craft, its lifeblood depends upon such action in response to national pressures to provide the best aircraft in the world and to do the job with the least possible tax-dollar cost. The task facing the industry can readily be seen when comparing the $58,000 cost of a World War II fighter with today's $233,000 craft and the $660,000 cost of a World War II bomber with today's $2 million bomber.

Here are the highlights of the AIA's economy program:

Management — Closer co-operation between design, tooling and manufacture is being practiced, members are exchanging more technical and production information within the industry and every employee is being made more cost conscious. The results—one manufacturer reports a saving of $22 million from its employee suggestion program; another reports 12 per cent increase in labor efficiency and 21 per cent decrease in overhead rates since 1941.

Engineering — Standardization and interchangeability of parts, long pushed for by the component makers, is being adopted; design is stressing minimum weight, simplicity, easier production and economical operation; technical information is rapidly disseminated to plant personnel and more emphasis is being placed on employee training programs. Savings cited include the standardization of a terminal panel for all fighter planes which saves about $190,000 annually, simplification of a bomb hoist that saved 84 per cent of its production cost and the use of an electric computer that reduced engineering time on a typical landing gear by 85 per cent.

Tooling—Here centralized management has been adopted; tools are designed for multiple use, made of the most economical materials possible and where possible made on an assembly line. On a 200-airframe contract a savings of $100,000 was made by the development and use of curved jaws in a stretch forming press. By putting construction of hydraulic stretch press dies on a production line one company hiked die output per worker by 72.7 per cent.

Manufacturing and Factory—Statistical quality control, breakdown of major assemblies, better use of space, simplification of paper work and better preventive maintenance are factors in this phase. Simplified forms saves one firm $100,000 per year, a new multiple drill press provides a savings of 99.5 per cent of machine time and one firm saved 10,000 man-hours per year by statistical quality control in sheet metal inspection.

Materials—The highlights here include co-ordinating purchases for most economical quantities, stimulating competition, checking waste and setting up reclamation programs. One manufacturer reports a saving of $1.5 million in one year through reclamation.

Four basic factors are pressing the need for economy measures not only in the military aircraft industry, but in most others as well. 1. Inflation has reduced the buying power of the dollar to half that of 1941. 2. Present day orders for aircraft are considerably less than during wartime, making the unit cost higher. Loss or reduced defense orders may have the same effect on your unit cost too. 3. Technical changes in equipment are costly but must be made to keep pace with other scientific and engineering discoveries. Your product may not have the large number of changes being made in aircraft, but it is nevertheless an important cost. 4. Greater superiority of products today tends to boost costs. Your equipment is probably doing a better job just as airplanes are flying faster and higher than ever before, but the improvements and additional equipment necessary to accomplish it are costly.

NPA Components Head

New director of NPA's General Components Division is Victor A. Spoehr, on leave from his post of vice president and general manager of M. H. Harper Co., Morton Grove, Illinois

SDPA Summarizes Aid

In spite of more than $723 million worth of assistance during the lifetime of the Small Defense Plants Administration, small business did not fare as well as larger companies after Korean hostilities began, according to SDPA's final quarterly report.

This summary, issued by William D. Mitchell, chief of the recently created Small Business Administration, states that, in spite of aid representing the total dollar value of contracts procured from the government and loans obtained through the agency's efforts, small producers gained less than 25 per cent while net sales of the bigger firms shot up 40 per cent through 1952.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor*

The first bird leaves the nest . . .

Martin Durkin's resignation as secretary of Labor may spark showdown in Taft-Hartley controversy. Issue promises plenty of powder for '54 election battles

WATCH for the long-overdue showdown in the controversy over the fate of Taft-Hartley Act now that Martin P. Durkin has resigned as secretary of Labor. Both the administration and Republican majority in Congress can be expected to act in the knowledge that labor legislation will be a key issue in the 1954 election campaigns.

The issue will lie between retaining and amplifying the T-H law's protections to the public and the strengthening of powers of the union leaders. President Eisenhower revealed which side he'll be on when he refused to accept the union amendments proposed by Mr. Durkin.

Power Proposals—The Durkin proposals rejected by President Eisenhower would strengthen the powers of union leaders immeasurably particularly in the latitude that would be allowed in the proposed legislation. It would have broadened the use of union hiring halls, eliminated mandatory injunctions against secondary boycotts, permitted secondary boycotts in the construction field, declassified much supervisory personnel now classified as supervisors, allowed the union shop throughout the construction industry, shortened the contract termination notice period from 60 to 30 days, eliminated the loss-of-status penalty for striking during that period and eliminated the provision authorizing state right-to-work laws so as to make the federal law paramount.

While the President has not explained his position in detail it can be assumed from the speed which he accepted the Durkin resignation particularly from the finality of his critical half-hour interview with Mr. Durkin in which he accepted the resignation that he felt himself unable to buy the proposals in toto.

More of the Same?—As to Congress, it is recalled that despite all the hue and cry and the months of work put in by the two labor committees there was an unwillingness in 1953 to eliminate the public safeguards in the Taft-Hartley Act. Some legislators predict that this attitude will be even more pronounced in 1954 in view of the refusal of the labor leaders to play if they can't have their way.

Administration supporters in Washington believe that adroit and honest handling of the issue will win votes among union rank-and-filers in 1954 despite opposition by labor leaders. They point out the big labor vote piled up by the late Senator Taft in 1952 in the face of militant opposition from the labor czars. The administration is left with some strong cards. The important thing is to play them right.

Union Hearings Set . . .

Hearings on "Communist penetration of our trade unions," according to Sen. John M. Butler (Rep., Md.), will begin about Nov. 1. Senator Butler is chairman of a task force of the Senate Government Operations Internal Security Subcommittee, which proposes to investigate the CIO-expelled United Electrical, Radio and Machine Workers of America, the International Union of Mine, Mill and Smelter Workers, the American Communications Association and others. The latter union, recently certified by the National Labor Relations Board as the exclusive collective bargaining agent for 5000 Western Union telegraph operators, is described by Senator Butler as a "Communist-controlled labor organization."

More Economy Efforts . . .

Part of the Eisenhower administration's economy plan is to end the old custom of performing many government services free or on a less-than-cost basis. Budget Director Joseph M. Dodge has ordered all federal agencies to review their activities with a view toward ending the "give-aways" and placing their services on a paying basis.

Small Business Loan Policy . . .

Small business loan policy of the new Small Business Administration is scheduled for announcement today, Sept. 21.

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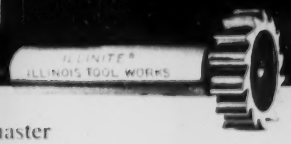

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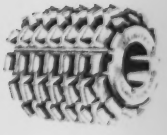

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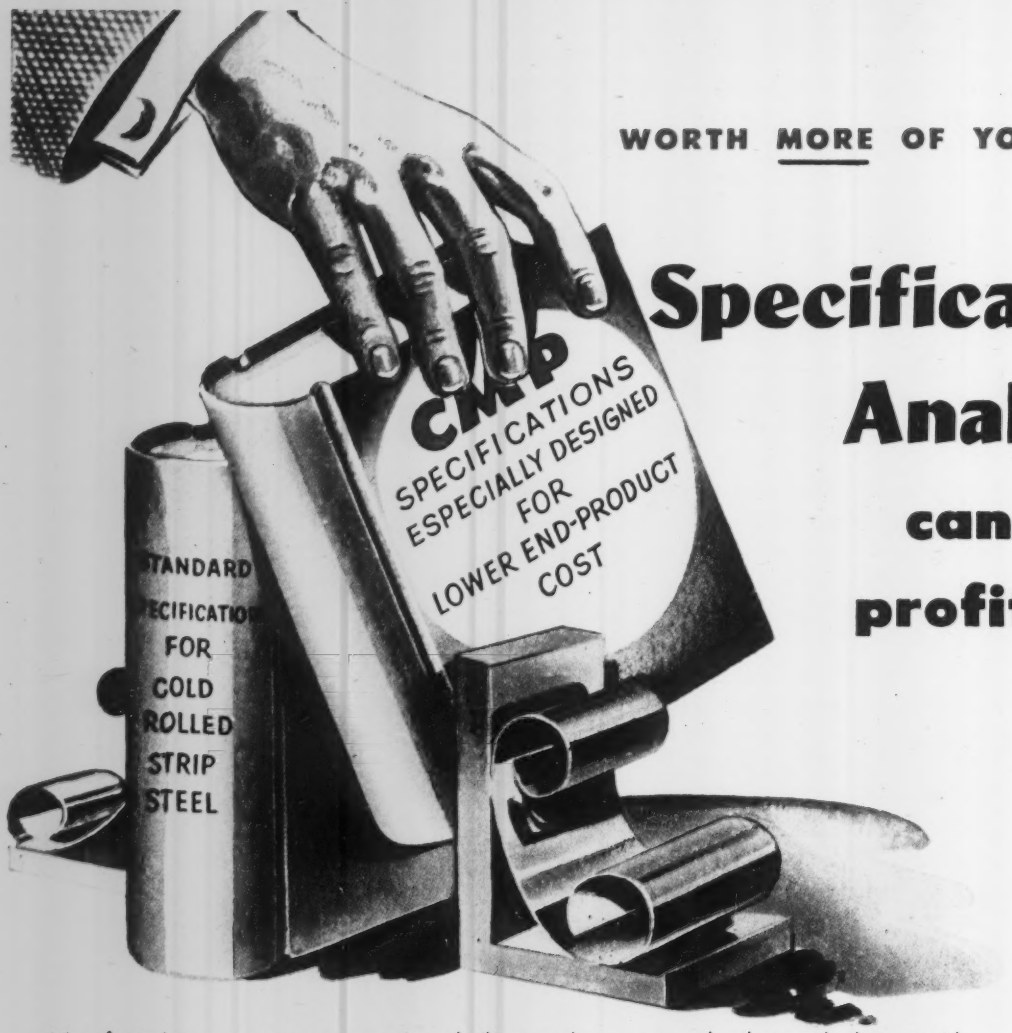

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Underdeveloped Countries Hit Snags

Reports that rapid industrialization would dry up some U. S. overseas markets are exaggerated. Underdeveloped countries are finding the going tougher than expected

INDUSTRALIZATION indigestion has gripped many underdeveloped countries of the world.

Sobering reports from foreign countries and Americans who deal overseas refute scarey warnings that the U. S. stands to lose overseas markets as potential customers themselves turn into industrial producers. The fact is U. S. metalworking manufacturers will have excellent markets in underdeveloped countries for years to come. Backward countries are hitting snags not apparent in their first rush toward industrialization.

To the Weak—Eugene R. Black, president of the International Bank for Reconstruction & Development, says the most important obstacles to economic growth in the world are not a shortage of capital or timidity of investors or the greediness of big companies, but rather weaknesses and mistakes in underdeveloped countries.

Mr. Black went on to enumerate the weaknesses: Lack of traditions of political responsibility, poor economic initiative, low standards of education and training and insufficient understanding that economic progress requires patience, effort and self-denial.

Robber Industries—Though certainly not alone, Union of South Africa might be pointed out as an example of haste-makes-waste industrialization. The governor of the South African Reserve Bank says the gold mines of the country, main income source, are operating on an average of 80 per cent of capacity. Labor and power shortages arising from the increasing demands of manufacturing industries was cited as one important reason for the low operating figure.

The Human Element — Lack of technical know-how is the main impediment to Pakistan's steel industry, says S. Frederick Magis, steel technologist at Armour Research Foundation, upon his return from a one-year stay there. Other factors, none of which promises to evaporate overnight, are a lack of trained administrators, obsolete equipment (of the country's 40 mills, only two had equipment that could be salvaged in a redevelopment program), lack of capital, and uneconomical methods of production on which the local steel mill owners must be "unsold."

Underdeveloped countries have made long strides toward industrialization since World War II. But, they're beginning to realize it takes more than aid money to keep industry going.

In the meantime, U.S. manufacturers can look forward to these tremendous overseas markets for metalworking end-products and capital equipment.

A Foreign Report

Christy A. Wilken, vice president of research and engineering, Rockwell Mfg. Co., comes up with these conclusions after a three-month tour of major industrial cities in European countries:

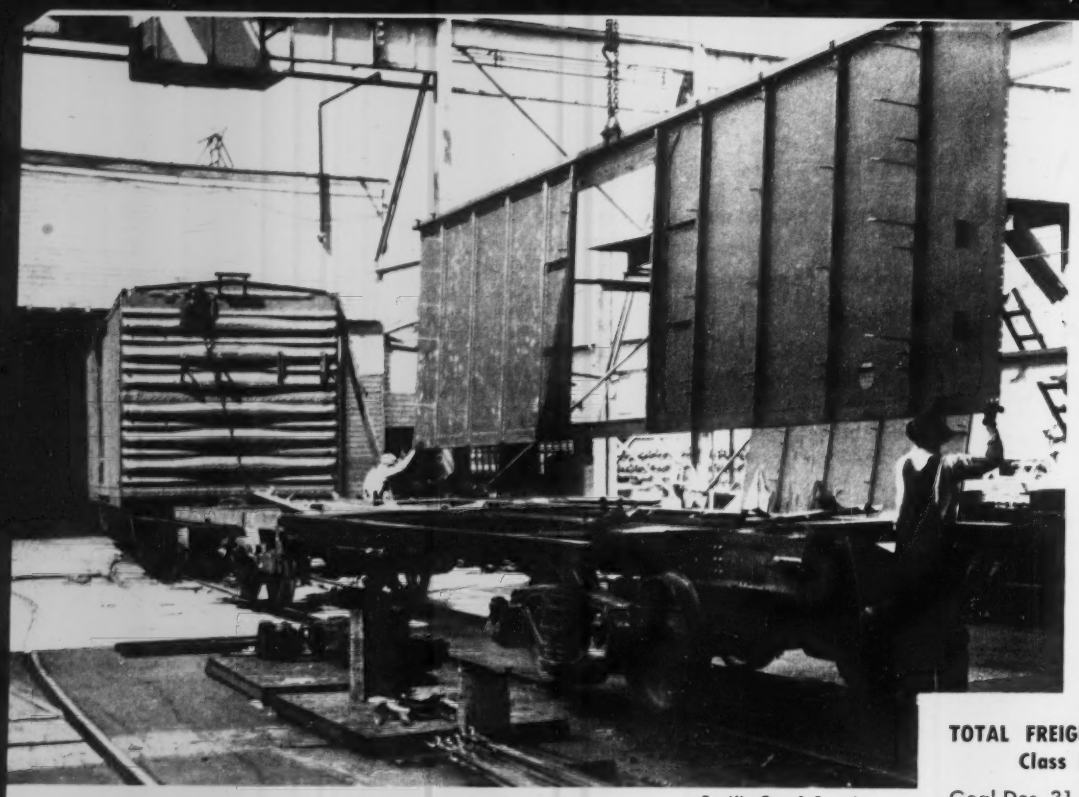
Leading German machine tool manufacturers have replaced their bombed-out plants and machinery with superior equipment that incorporates latest design ideas, leaving them with the world's best-equipped machine tool plants.

Europe is guaranteeing for itself a permanent reservoir of highly trained machinists and tool experts probably unmatched in this country through its apprentice system. Mr. Wilken found plants everywhere training from 10 to 500 apprentices from 14 to 17 years of age. Apprentices usually train for 3½ years with separate facilities set aside for them. At regular intervals they spend three months in production shops.

Throughout Europe, Mr. Wilken found increased interest in industrial research and a more plentiful supply of scientists and designers to carry it out. Because the salaries of these experts are less than those expected by their American counterparts, he says, American research institutes are beginning to build laboratories abroad where they can better afford "follow-up" projects.

Unusual Crop for a Hungarian Field

First blast furnace of Hungary's Stalin Iron & Steel works was blown in recently. The second blast furnace is expected to be ready in 1954 when four open hearths will also be brought into service. Other facilities at this site include 81 coke ovens, a chemical by-product works, a cement and ceramics factory and a 300-million kwhr power plant



Pacific Car & Foundry

TOTAL FREIGHT CARS OWNED
Class I Railroads

Goal Dec. 31, 1954	1,850,000*
Total Aug. 1, 1953	1,769,384
Total Aug. 1, 1952	1,762,558
Total Aug. 1, 1951	1,735,541

* Goal set July, 1950
Source: Association of American Railroads

Freight Car Building: Will the U. S. Press For the 1.85-Million Car Goal?

REDUCED PRESSURE in production of most hard goods items is also being reflected in the nation's freight car building program. Railroad and car building officials look for continued present-level production for the fourth quarter, but they have adopted a "wait and see" attitude for 1954.

New freight car orders bounced up to 3913 in August, the highest for any month this year since January, but ordering is down generally and below current production. The August orders increase was the result primarily of the Erie Railroad Co.'s 1000 freight car order (STEEL, Aug. 24, p. 148).

The Goal—Actual ownership of freight cars is steadily increasing, but few expect the total to reach the 1,850,000 car goal set July, 1950, by the railroads and government for the end of 1954. Class I railroads owned 1,769,384 freight cars on Aug. 1, 1953. This does not include refrigerator cars owned by subsidiaries, which would bring the total to 1,851,429 cars.

In 1949 the total ownership (not including refrigerator cars) was 1,770,949. With the start of the Korean war, ownership started to drop because car retirement became greater than new car production and the military took cars out of commercial work for its own use.

The New Ones—Deliveries of new freight cars should total over 70,000 this year, according to Association of American Railroads figures. This rate is far below the government's goal of 10,000 new cars per month which it estimated it would need to hit the 1.85-million 1954 mark. The closest industry ever got to the 10,000 mark was in May, 1951, when it delivered 9774 new freight cars.

New car deliveries for the month of August totaled 5557 compared with 6370 in July to bring the year's total to about 47,172. Class I railroads expect to get about 53,000 of the estimated 70,000 freight cars this year. With 5000 cars the normal retirement rate, such a trend would result in a net loss in car ownership at the end of the year. However, the retirement rate has been reduced and is averaging only 4034 this year so that little change in the number of cars owned by the railroads is expected at year's end.

Steel plate supply has begun to catch up with demand making increased production of freight cars possible, but railroads are not hurrying to place new orders.

Their Age—Most popular cars on order currently are the gondola and hopper cars, although the box car still remains the most widely used. The average age of today's freight car is nearly 20 years and over 16 per cent have had 30 years of service. Most financing of new cars is done directly through banks or insurance companies.

The pinch if it does come in 1954 will be felt in the commercial car shops first, rather than in the railroad shops. For the past five years commercial shops have produced 68 per cent of the new freight cars, but production is now approaching the 50-50 mark. During capacity hauling periods railroads keep their

shops busy with repairs, but as the repair jobs drop they build a greater proportion of cars to keep their own shops busy.

Pointed — Pointing up the car building decline is the number of cars on back order. According to the AAR, there were 45,735 freight cars on order and undelivered Sept. 1, 1953, 26,768 with commercial shops and 18,967 with railroad shops, compared to a backlog of 79,514 cars in August, 1952.

The figures do not present too bright an outlook for next year. Commercial shop orders represent a backlog of about four months. For normal one-shift operations to pay off they should have a backlog of about six months and this means new car orders of about 8000 cars per month.

An Estimate—Officials of U. S. Steel Corp., which is a large producer of steel for car building, predict that an average of 5000 cars per month will be built in 1954 with the top month totaling about 7000. They also predict 80,000 cars will be retired. Net gain will be little.

The car building picture, however, is causing no more concern than is generally being experienced by other industries during the current adjustment. Watch for more government pressure to meet the 1.85 million freight car goal to keep pace with the defense program. That many cars would be needed to take care of civilian and military needs during full mobilization.

Transport Big Steel Consumer

"One-third of all steel that will be consumed in the United States during 1953 will go directly into equipment for transportation," remarked Clifford F. Hood, president of U. S. Steel Corp., at a Pittsburgh dinner of the American Society of Traffic & Transportation Inc.

"Out of a safely predictable total of better than 76 million tons of finished steel this year, an estimated 24.9 million tons will go into transportation," Mr. Hood continued. "Estimates show that the auto industry will consume 14 million tons of steel; the railroads 5.5 million; pipeline constructors 3 million; highway builders 1.5 million; shipbuilders 700,000 and aircraft builders 200,000 tons."

Film Beckons Tool And Die Apprentices

NTDMA makes its bid to help lick the apprentice shortage with a motion picture just released

Scenes from the NTDMA movie, "Tool and Die Making—Keystone of Mass Production": Above, blueprint reading, shop mathematics and machinery operation are skills the apprentice must master. Below: as the apprentice nears journeyman status, operation of precise tools becomes second nature

APPRENTICE SHORTAGE talk has brought action from the National Tool and Die Manufacturers Association in the form of a motion picture, "Tool and Die Making—Keystone of Mass Production."

Shown for the first time on Sept. 15, the 16-mm color and sound film has as one of its aims the encouragement of young men with mechanical aptitude to become tool and die apprentices by informing industry, government and the general public of the nature of contract tool and die making.

The film follows the progress of an apprentice through the 8000-hour course leading to journeyman status. It shows him learning by doing operating machines, studying blueprint reading, shop mathematics and shop theory and learning complex techiques. The photographs shown here are scenes taken from the film. Sequences were filmed at tool and die shops and manufacturing plants in the East and Midwest.

The tool and die apprentice spends much of his time in actual shop work. Early in the 8000-hour apprentice course he learns to use basic machines of his craft, like this lathe

Examples of toolmaking practices in the manufacture of such diverse items as zippers and automobile crankshafts give a practical punch to the picture and serve to point up the toolmaker's constant emphasis on accuracy.

Emphasized also are the educational advantages, the "earn-while-you-learn" feature of apprenticeship and the position of respect and high pay held by the journeyman tool and die maker.

Showings of the film will be held in the twenty-three centers of the National Tool and Die Manufacturers throughout the country. Prints are available for loan or purchase through the association's offices, 907 Public Square Building, Cleveland 13, Ohio.

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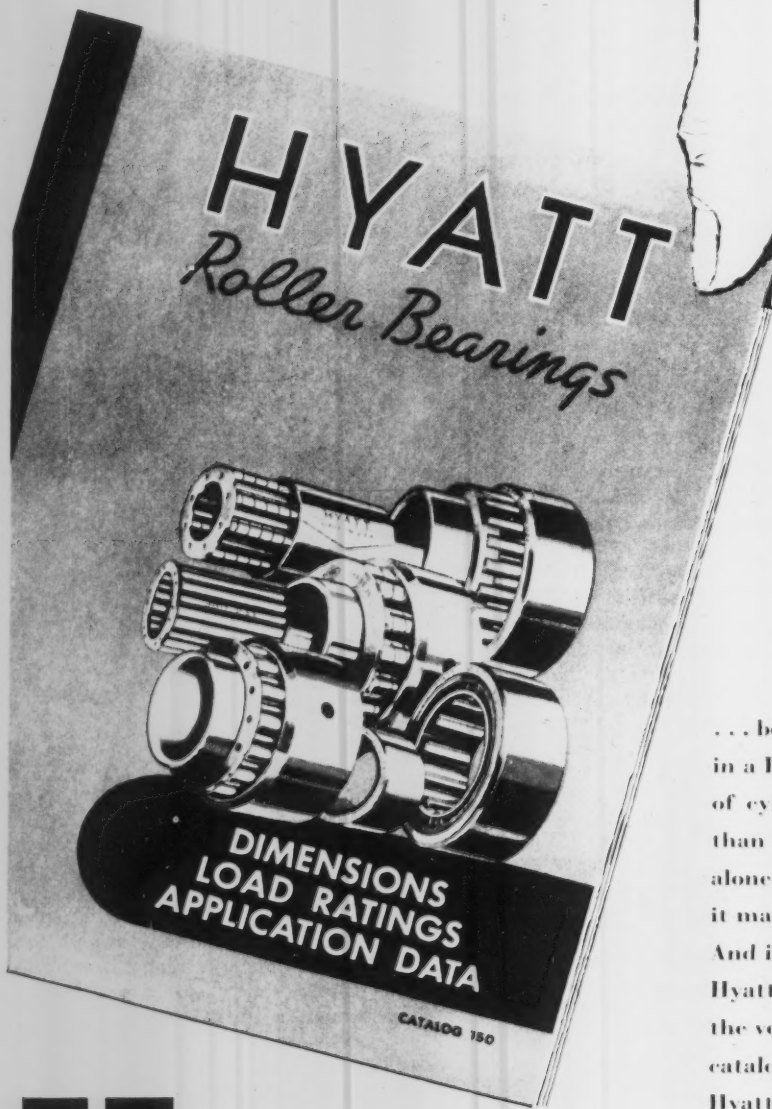

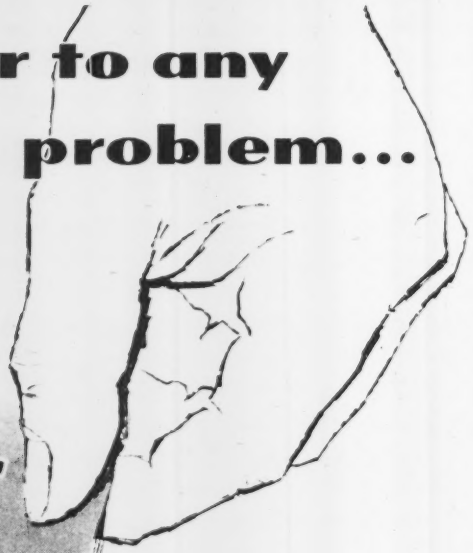

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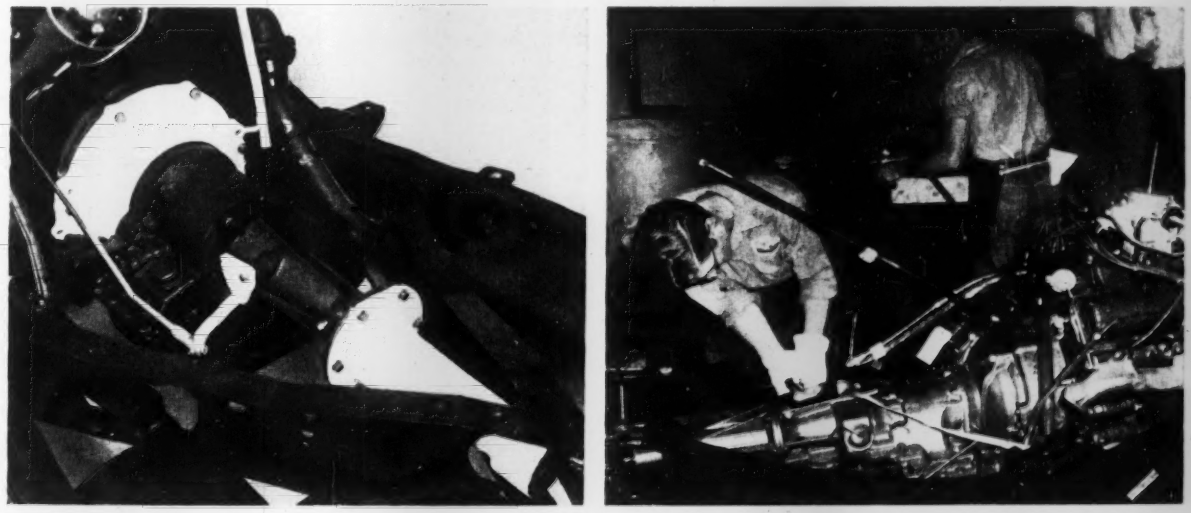
HYATT ROLLER BEARINGS

By FLOYD G. LAWRENCE *Detroit Editor*

Mirrors of Motordom



Fast work, new parts (in white, left) adapt Cadillac engines for Dynaflow . . .

Just 27 days after Livonia, Cadillac rolled its first Dynaflow-equipped car off the line. Here are the engineering story and first road-test report on the car

DETROIT

THERE'S a new saying in the Motor City—"When better Buicks are built, Oldsmobile and Cadillac will build them."

This remark, to an outsider at least, contains a certain amount of humor. But since Cadillac and Oldsmobile adopted Dynaflow following the cutoff of Hydra-Matic output by the Livonia fire, there have been opportunistic remarks by competitor companies more malicious than humorous.

Not Brand Conscious—Transmissions generally are not brand-conscious. They absorb the torque input of the engine and deliver output torque to the rear wheels. But the input and output limitations of a transmission are carefully studied before it ever goes into production. If the engine output and drive load translate into torque demands which fall within the rated limitations of the transmission, the basic requirements for good service are satisfied.

This was the rudimentary information with which Cadillac engineers began to work on Thursday morning, Aug. 13. By three o'clock that afternoon, less than 24 hours after the start of the Livonia fire, engineers had made their basic decision: It could be done. The next question was whether or not Buick could supply the transmissions. A trip to Flint the next day assured Cadillac of Buick technical and production assistance on the project and Cadillac began to go for production.

Fast Work—The first step was to build a production prototype. Engineers began the first installation Friday night. By Sunday evening the installation was finished, complete with new castings poured from wooden patterns. On Monday morning the car was demonstrated to management and the basic installation was approved. Now translation of the prototype to production began, even as the prototype itself began engineering tests.

To adapt the torque converter to the Cadillac cylinder block, a completely new flywheel housing, rear bearing retainer casting, rear bearing retainer extension and lower bell housing had to be cast. The wooden patterns of the prototype were flown to Omaha, Neb., to be translated into steel for production. The converter pump cover required a shorter hub to nestle into the Cadillac crankshaft. A new flywheel starter ring gear and machining changes in the cylinder block required alterations in existing machines and tooling. All were quickly supplied.

Modifications—Other new parts include a redesigned bracket to relocate the transmission oil cooler, a new rear engine support bracket, a new transmission shift control linkage, a new shift control stop plate and a new selector position dial. The Cadillac twin exhaust pipes are bent outward in new jigs to accommodate the greater breadth of the torque converter unit. A dash pot is added to the carburetor to damp throttle closing and the carburetor is recalibrated. To complete the adaptation, the formerly optional 3.36:1 rear axle ratio is incorporated, giving an increase over the 3.07:1 now standard with Hydra-Matic.

Just 11 days after the decision was made to go for production on Dynaflow and only eight days after the prototype was completed, the first car with all-production parts was finished. The rapidity and extent of the changes comprise a unique accomplishment in automotive annals.

No Make-shift—Some of the major components which have been changed and the first production-

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line Dynaflow installations are shown in the accompanying photographs. It is apparent that despite the speed and extensiveness of the changes, the Dynaflow-equipped Cadillac is a production automobile in every sense of the word and not an expedient. Accelerated engineering tests and deliberate overstrengthening at possible failure points indicate that the cars will prove dependable.

And how does it feel to drive a Cadillac equipped with Dynaflow? A recent test-drive of one of the first three Cadillacs equipped with production Dynaflow reveals that the car has definitely not transmuted into a Buick. It is still very much a Cadillac, but the sensation is different and definitely pleasant. The surge of power is smooth since there is no upshifting with Dynaflow. By the same token, initial takeoff suffers without the Hydra-Matic torque multiplication but not objectionably. Passing acceleration in the 40-70 mph range remains excellent.

In Some Ways Better—Perhaps you will recall in our driver reaction to the Cadillac we reported (STEEL, June 29, p. 62) " a peculiar characteristic in acceleration from about 20 mph. At this speed third gear is rather sluggish while the downshift to second is accompanied with plenty of go but an annoying jerk as the gear cuts in." That condition is eliminated with the shift-less Dynaflow.

Whether you prefer smoothness or performance is a matter of opinion. Hydra-Matic epitomizes performance and Dynaflow is as smooth as they come. The Cadillac engine whips that Dynaflow juice in a way it's never been whipped before and in our book the addition of Dynaflow to the Cadillac is no impairment.

Cadillac engineers aren't denying that they're pleased with the results, and if enough people feel the same way it's quite possible that Dynaflow will become a listed option on the "Standard of the World."

Other High Dramatics

The five remaining makes of cars hit by the transmission cutoff were beginning to get power to their rear wheel to start moving last week. Oldsmobile rolled its first score of Dynaflow-equipped cars off the Lansing assembly line Sept. 2 and is supplementing output with Syncromesh cars for a total of 550-600 cars daily. This output is near capacity for the Lansing operation, but the Buick-Oldsmobile-Pontiac plants are still hit by the Hydra-Matic curtailment.

Hudson is reported to have concluded arrangements for up to 4000 Borg-Warner units monthly. With Studebaker halting production to allow dealers to dispose of inventories, it appears that Hudson will get its full quota for some time. Available Hydra-Matics were used to get 1954 models now being produced into dealers' hands for new model introduction.

Nash, which resumed production following strike settlement last Monday, reports enough Hydra-Matics are available to sustain production through the 1953 model run which should be ending shortly. It is hoped that Hydra-Matics will be available by new model introduction late in November.

Pontiac swung to Powerglide production in earnest early last week with the BOP plants slated to join the show late last week. The proportion of cars Powerglide-equipped will be somewhat less than the Hydra-Matic output with total production off about 20 per cent from normal output as BOP plants reach production this week.

Still imponderable as this column was being written last week was Lincoln. Rumors continued to fly that the Merc-O-Matic would be adapted for Lincoln usage but one engineer reported off-the-record that the adaption was questionable mechanically and economically. The final crates of Hydra-Matics were emptied last week and with possible resumption of output in about a month, it seems a good bet that Lincoln will wait out return of the unit. Meanwhile, output of the Mercury is being increased following higher sales of the Mercury during August than in any month for the last three years.

Auto, Truck Output
U. S. and Canada

	1953	1952
January	612,815	424,559
February	623,793	464,577
March	752,474	525,024
April	782,453	570,464
May	685,390	542,559
June	713,206	542,479
July	757,595	226,134
August	641,242	322,755
September		595,715
October		656,767
November		548,782
December		569,715
Total		5,989,509
Week Ended	1953	1952
Aug. 15	156,526	36,890
Aug. 22	163,635	109,588
Aug. 29	152,866	122,659
Sept. 5	132,574	111,095
Sept. 12	122,497	137,295
Sept. 19	125,000*	142,494

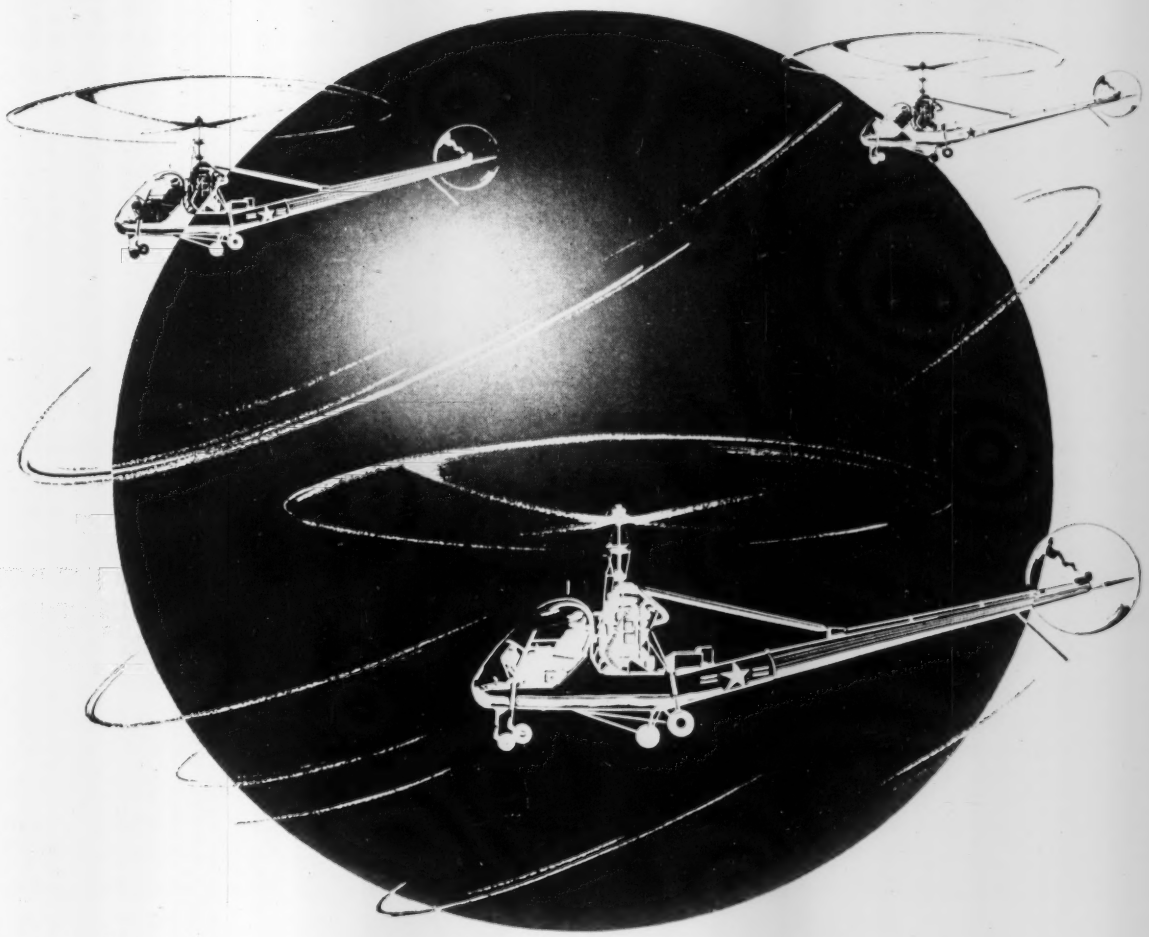
Sources: Ward's Automotive Reports
*Estimated by STEEL

From the Wastebasket

An interesting styling probe is incorporated in the Packard "Balboa" shown recently at the Michigan State Fair. The rear window has a reverse slope and is covered by a canopy which gives the car somewhat the appearance of a guppy swimming backwards. But, despite the startling appearance of the deal, the rear window is protected from sun, rain, etc., and can be rolled down like other windows on the car. In addition, the overhang permits greater headroom in the rear seat, a feature designers have been trying to accomplish for some time.

Sales of hard-tops are running 78,500 per month this year compared with only 46,900 last year. With approximately 2 million hardtops purchased since the style was introduced, General Motors has made 56 per cent of the total, Ford Motor Co. has made 25 per cent, Chrysler built 8 per cent and the independents 11 per cent.

Next year Pontiac, Mercury and Nash will introduce air conditioning in addition to Buick, Oldsmobile, Cadillac, Dodge, DeSoto, Chrysler, Lincoln and Packard already so equipped. Although no more than 35,000 cars may be equipped with air conditioning in 1953, GM alone is gearing for a 100,000 volume in 1954.



Revolution in Accuracy

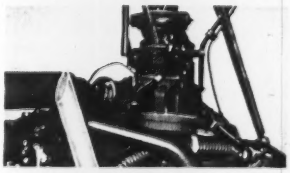
Rescue work . . . submarine hunt . . . aerial photography . . . the Hiller helicopter is a versatile performer. It can hover in one place, move up and down, forward and backward. That's why the Hiller demands bearings that carry all loads, that *stay* rigidly accurate, even under sudden shifts in blade speeds. New Departure meets that demand with bearings for Hiller applications shown below. Besides such heavy duty applications, New Departure makes a wide range of minute bearings for sensitive aircraft instruments. *Every* New Departure bearing—from midget to giant—is backed by the industry's most complete research and engineering facilities—all of which stand ready to serve the manufacturers' design and engineering staffs.

NOTHING ROLLS LIKE A BALL

NEW DEPARTURE

BALL BEARINGS

NEW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONNECTICUT
Also Makers of the Famous New Departure Coaster Brake



Main transmission of the Hiller helicopter uses New Departure bearings in the clutch assembly.

Tail rotor gear box, another of the Hiller's vital moving parts, is equipped with New Departure ball bearings.

Why pay for the steel you waste when you make hollow parts?

WHEN you make hollow parts from bar stock, you pay for chips and shavings you bore out and throw away! With Timken* seamless tubing, you eliminate this waste. The hole's already there. Finish boring is often the first production step. You cut machining time—get more parts per ton of steel.

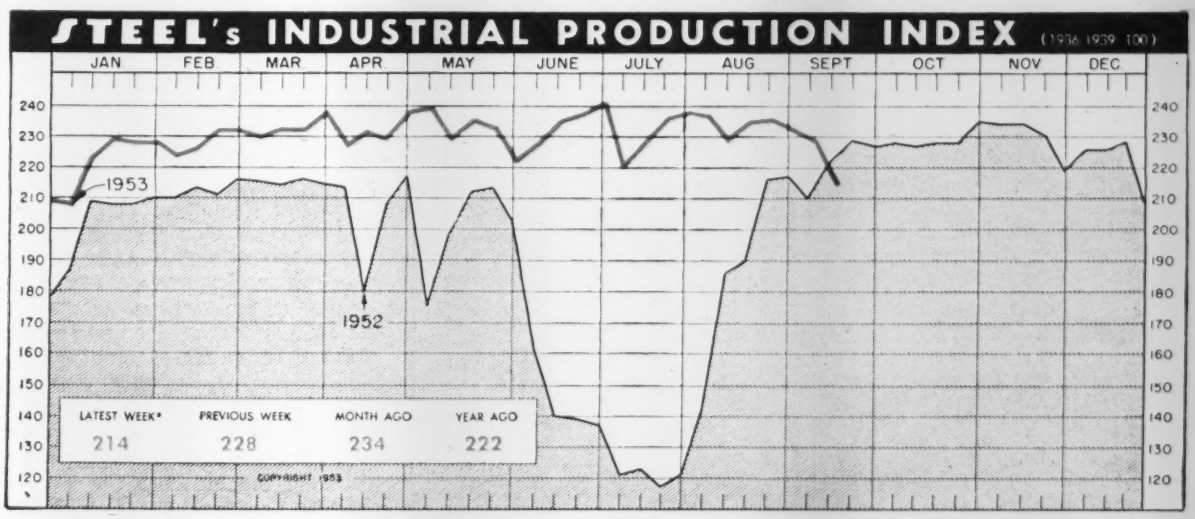
You make your machine tools more productive by using Timken seamless tubing. Screw machine stations normally used for drilling can be released for other jobs. You get added machine capacity without additional machines.

To save you even *more* steel, the Timken Company's engineers will study your problem and recommend the most economical tube size for your hollow parts job—guaranteed to clean up to your dimensions.

Timken seamless tubing has fine forged quality. That's because the piercing process by which it is made is basically a forging operation. It gives the tubing a uniform grain flow for greater strength and a refined grain structure which brings out the best in the quality of the metal. The Timken Company's rigid quality control makes sure the quality is always uniform from tube to tube and heat to heat. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING



*Week ended Sept. 12 Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automotive Assemblies (Wards' Reports) 20%

Production level will moderate slightly during the remainder of 1953. Withdrawal of heavy military demands leaves a reservoir of capacity

AN EASIER industrial production pace is indicated for the autumn months. Industry will turn out a high volume of goods, but operations will likely be lower than those prevailing over the first eight months. The frantic scramble for materials no longer will dominate the production scene.

Coming weeks will bring a moderate upturn in STEEL's industrial production index from the Labor Day week's low of 214, when holiday interruptions caused output to drop 14 points to the lowest point since the first week in January. For the first time this year, the index dipped below the comparable 1952 rate.

Factors causing the decline were a reduction in automobile outturn and a lower steel operating rate.

Automobile Output Slides . . .

The 116,121 cars and trucks built by U. S. manufacturers in the week ended Sept. 12, was the lowest volume in 14 weeks, says *Ward's Automotive Reports*. As a result of the holiday, outturn dipped almost 9 per cent below the previous week and, for the first time, fell below the comparable week in 1952. But output so far this year now exceeds the 5,555,780 units completed in the entire year of 1952.

Retail deliveries of new cars are holding firm to a 6 million unit annual pace and new car stocks are only slightly above one month's supply. As of Aug. 31 dealers' inventories of new automobiles had risen for the thirteenth consecutive month and stocks are estimated at just under 500,000 units. Cadillac has a unique position in being the only producer whose orders still exceed deliveries.

Steel Production Adjusts . . .

Like automotive outturn, steel production slipped during the latest week. The operating rate, estimated by STEEL, for the week ended Sept. 12, was 88.5 per cent of capacity. At this rate, production was lower than any time during the past 13 months. Anticipation that operations will not soon return to former levels is responsible for recent declines in scrap prices.

The recent production adjustments in the steel industry were preceded by the greatest 12 months of output in history. From September, 1952, through August of this year, furnaces poured 114,600,000 net tons of steel, the American Iron & Steel Institute says. During the week just ended, steel output was estimated at 2,036,000 net tons, a slight rise from the preceding week.

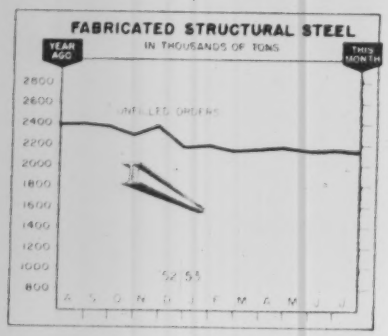
Appliance Producers Ready . . .

Correction of the supply-demand relationship appears to have been made by the appliance industry during the past three months. Although many manufacturers have raised prices on their products recently, higher sales have brought inventories of finished appliances into a better relationship with sales.

Present optimism of gas appliance manufacturers is traceable to the rapid expansion of natural gas pipelines and the incorporation of automatic features in their manufactures. Multiple purchases orders for gas ranges and water heaters at the same time by owners of new and remodeled homes have increased sales, also.

Electric Output Sets Record . . .

The same factors can be applied to sales of electric appliances. Moreover, heavy sales during the early part of the year have had a noticeable effect on the demand for electric power. Generation of 8,-

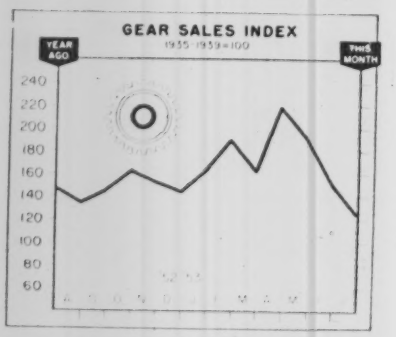


Fabricated Structural Steel

Thousands of Net Tons

	Shipments		Backlogs	
	1953	1952	1953	1952
Jan.	241.4	244.9	2,180	2,416
Feb.	251.1	246.4	2,128	2,408
Mar.	266.3	268.8	2,155	2,501
Apr.	263.2	230.7	2,168	2,350
May	263.8	244.2	2,179	2,263
June	274.6	125.6	2,153	2,261
July	222.0	138.3	2,131	2,361
Aug.		226.3		2,363
Sept.		227.6		2,342
Oct.		261.7		2,266
Nov.		222.6		2,357
Dec.		225.2		2,153
Total		2,661.3		

American Institute of Steel Construction



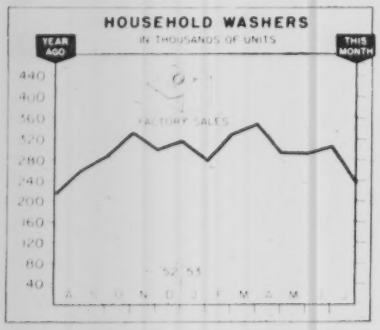
Gear Sales Index

(1947-1949 = 100)

	1953	1952	1951
Jan.	161.4	670.6*	761.6*
Feb.	188.1	539.5*	809.1*
Mar.	158.9	517.1*	830.7*
Apr.	217.1	478.7*	742.5*
May	189.8	425.9*	667.1*
June	116.5	452.3*	800.9*
July	120.7	145.3	589.1*
Aug.		132.3	564.2*
Sept.		143.1	630.0*
Oct.		160.8	703.4*
Nov.		150.9	530.0*
Dec.		110.9	716.5*

*1935-1939 = 100

American Gear Mfrs. Assn.

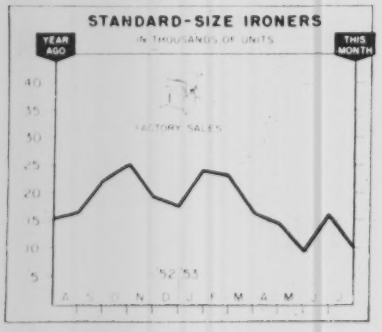


Household Washers

Sales Billed Units

	1953	1952	1951
Jan.	277,309	213,598	321,062
Feb.	326,604	255,564	311,328
Mar.	345,989	248,431	368,456
Apr.	288,474	217,211	292,193
May	286,515	213,668	253,942
June	301,056	274,457	253,119
July	228,268	207,593	139,799
Aug.		254,537	239,084
Sept.		283,732	313,756
Oct.		327,814	297,210
Nov.		293,079	262,184
Dec.		310,661	218,661
Total		3,101,013	3,301,123

American Home Laundry Mfrs. Assn.



Standard-Size Ironers

Factory Sales Units

	1953	1952	1951
Jan.	21,394	15,636	21,600
Feb.	22,586	17,630	32,400
Mar.	16,066	13,913	34,700
Apr.	14,080	8,934	23,700
May	9,323	12,652	24,200
June	12,529	17,654	24,500
July	9,626	15,025	11,100
Aug.		16,477	17,200
Sept.		22,492	18,300
Oct.		25,204	29,500
Nov.		19,724	20,500
Dec.		16,798	16,900
Total		202,143	277,700

American Home Laundry Mfrs. Assn.

Charts Copyright 1953 STEEL

Issue Dates on other FACTS and FIGURES Published by STEEL

Construction	Aug. 10	Indus. Production	Sept. 14	Ranges, Gas	Sept. 7
Durable Goods	Aug. 10	Machine Tools	Aug. 3	Refrigerators	Aug. 3
Employ., Metalwk.	Aug. 10	Malleable Castings	Sept. 7	Steel Castings	July 20
Employ., Steel	Aug. 31	Prices, Consumer	Aug. 31	Steel Forgings	July 20
Foundry Equip.	Sept. 14	Prices, Wholesale	Aug. 24	Steel Shipments	Sept. 7
Freight Cars	Aug. 24	Pumps	Aug. 24	Vacuum Cleaners	Aug. 3
Furnaces, Indus.	Sept. 14	Radio, TV	Aug. 31	Wages, Metalwk.	Aug. 31
Gray Iron Castings	Sept. 7	Ranges, Elec.	Aug. 3	Water Heaters	Sept. 14

694,301,000 kilowatt-hours in the week ended Sept. 5, set another record, according to the Edison Electric Institute. All areas of the country participated in the increased use, and, as it has been through most of the summer, the southeastern states led all other sections in percentage of increase over 1952.

Railroad Earnings Up . . .

Joining the electric utility industry in receiving a larger net income are the railroads. Net earnings, for the first seven months of 1953, after interest and rentals, have been estimated at $490 million, compared with $348 million in the corresponding period of 1952, the Association of American Railroads reports. Alongside the expanding earnings lies the gain in freight loadings that has taken place so far this year. Through the week ended Sept. 5, a total of 26,713,892 cars of revenue freight had been loaded. This compares with 25,400,944 carloads in the same period last year, which includes the time of the steel strike.

Truck Transportation Climbs . . .

Another industry that is doing better this year than last is the motor carrier. Inter-city truck tonnage transported by these vehicles in the second quarter of 1953 was 13.5 per cent greater than that carried in the same period of 1952. The extent to which inter-city trucking has increased in recent years is spotlighted even better by the index of the American Trucking Associations, which rose to a new record, 261 per cent of the 1941 average in the second quarter of this year.

Securities Market Activity . . .

Turning to banking, the most interesting recent development is the great increase in loans to brokers and dealers for purchasing or carrying securities. According to the Federal Reserve System's balance sheet of weekly reporting member banks in leading cities, these loans went up $183 million in the week ended Sept. 2. This increase is almost half of the total gain of $378 million, which has occurred since Sept. 3, 1952. From these

BAROMETERS OF BUSINESS

	LATEST PERIOD	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Output (per cent of capacity)[2]	88.5	95.5	101.0
Electric Power Distributed (million kwhr)	7,963	8,694	7,654
Bitum. Coal Output (daily av.—1000 tons)	1,595	1,628	1,533
Petroleum Production (daily av.—1000 bbl)	6,500[1]	6,534	6,461
Construction Volume (ENR—millions)	$321.0	$273.5	$264.6
Automobile, Truck Output (Ward's—units)	122,497	132,574	137,295
TRADE			
Freight Car Loadings (unit—1000 cars)	700[1]	799	881
Business Failures (Dun & Bradstreet, no.)	131	178	91
Currency in Circulation (millions)[3]	$30,479	$30,240	$29,364
Dept. Store Sales (changes from year ago)[3]	0%	9%	1%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$12,928	$16,187	$14,962
Federal Gross Debt (billions)	$273.3	$273.3	$262.8
Bond Volume, NYSE (millions)	$1.1	$1.3	$1.4
Stocks Sales, NYSE (thousands of shares)	4,538	6,554	6,099
Loans and Investments (billions)[4]	$79.4	$79.3	$75.2
U. S. Gov't. Obligations Held (billions)[4]	$31.8	$32.0	$31.9
PRICES			
STEEL's Finished Steel Price Index[5]	189.38	189.38	181.31
STEEL's Nonferrous Metal Price Index[6]	206.9	206.9	223.2
All Commodities[7]	110.3	110.3	111.8
Commodities Other Than Farm & Foods[7]	114.7	114.7	113.2

[1]Dates on request. [2]Preliminary. [3]Weekly capacities, net tons: 1953, 2,254,459; 1952, 2,077,040. [4]Federal Reserve Board. [5]Member banks, Federal Reserve System. [6]1935-1939=100. [7]1936-1939=100. [8]Bureau of Labor Statistics Index, 1947-1949=100.

figures, it might be inferred that a change in the market is anticipated for the near future by some dealers and customers.

Bank Deposit Growth Stunted . . .

Concerning banking generally, the Federal Deposit Insurance Corporation says that total deposits of all insured banks increased 3 per cent during the year ended June 30. This rate of growth compares with a 7 per cent gain in the preceding fiscal year and was the smallest rise during any of the last four years. The 3 per cent increase in deposits was paralleled by a 3 per cent climb in assets over the year.

Government Holdings Drop . . .

Assets of the 13,435 commercial banks totaled $180 billion on June 30. Another $20 billion in assets were held by insured mutual savings banks. Both types of banks held fewer U. S. government obligations than they did a year earlier. For commercial banks the decline amounted to over $2 billion. Largely accounting for the decrease in federal obligations was the increase in loans. Total loans at commercial banks were 10 per cent more than in June, 1952 and residential real estate loans from mutual savings banks towered 17 per cent above a year earlier.

Inventory Rise Slowed . . .

In line with the tight conditions existing on the money markets, business tried to hold inventories down during July. Although, stocks rose over the previous month by about $600 million, on an adjusted basis they totaled $77.3 billion, almost unchanged from June.

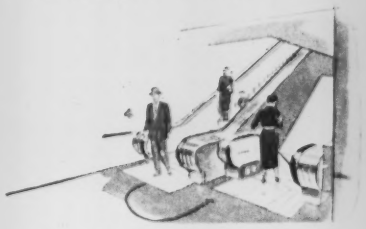
Primary Prices Dip . . .

It may be a good thing for many businesses that inventories were stable, for a slight decline in prices at the wholesale level is revealed by the Bureau of Labor Statistics for August. The index of primary prices was 110.6 per cent of the 1947-1949 average in August, 0.3 per cent less than the previous month.

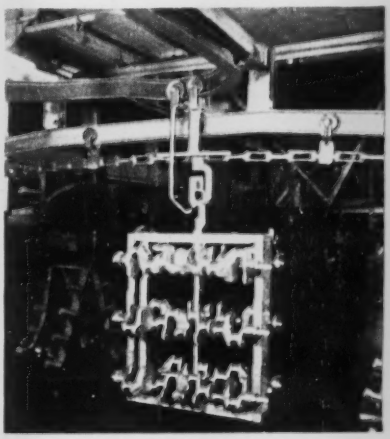
Trends Fore and Aft . . .

After reaching an all-time high in August, construction costs dipped 0.3 per cent to 610.2 per cent of the 1913 average, *Engineering News-Record* says.

Trans-Free Automation



Trans-Free Conveyor System *— automatically transfers loads from main Live Line to Free Lines—and back again.*



One of the intermediate production stations in the Allied Trans-Free Conveyor System, showing a rack of parts being transferred from the *Live Line* to the *Free Line*.

At various locations production parts can be automatically removed from the main Live Line to adjacent Free Lines. At these points, intermediate production operations are performed. Upon completion, the loads are automatically transferred back to the main Live Line.

The Allied Trans-Free System is applicable to any type of product, large or small.

Allied are specialists on *Automation* and highly engineered *Load Transferring* material handling systems. Consult with our engineering staff on material handling problems that arise in your plant.

See Allied Catalog 952 in Sweet's Mechanical Industries or write us for a copy.

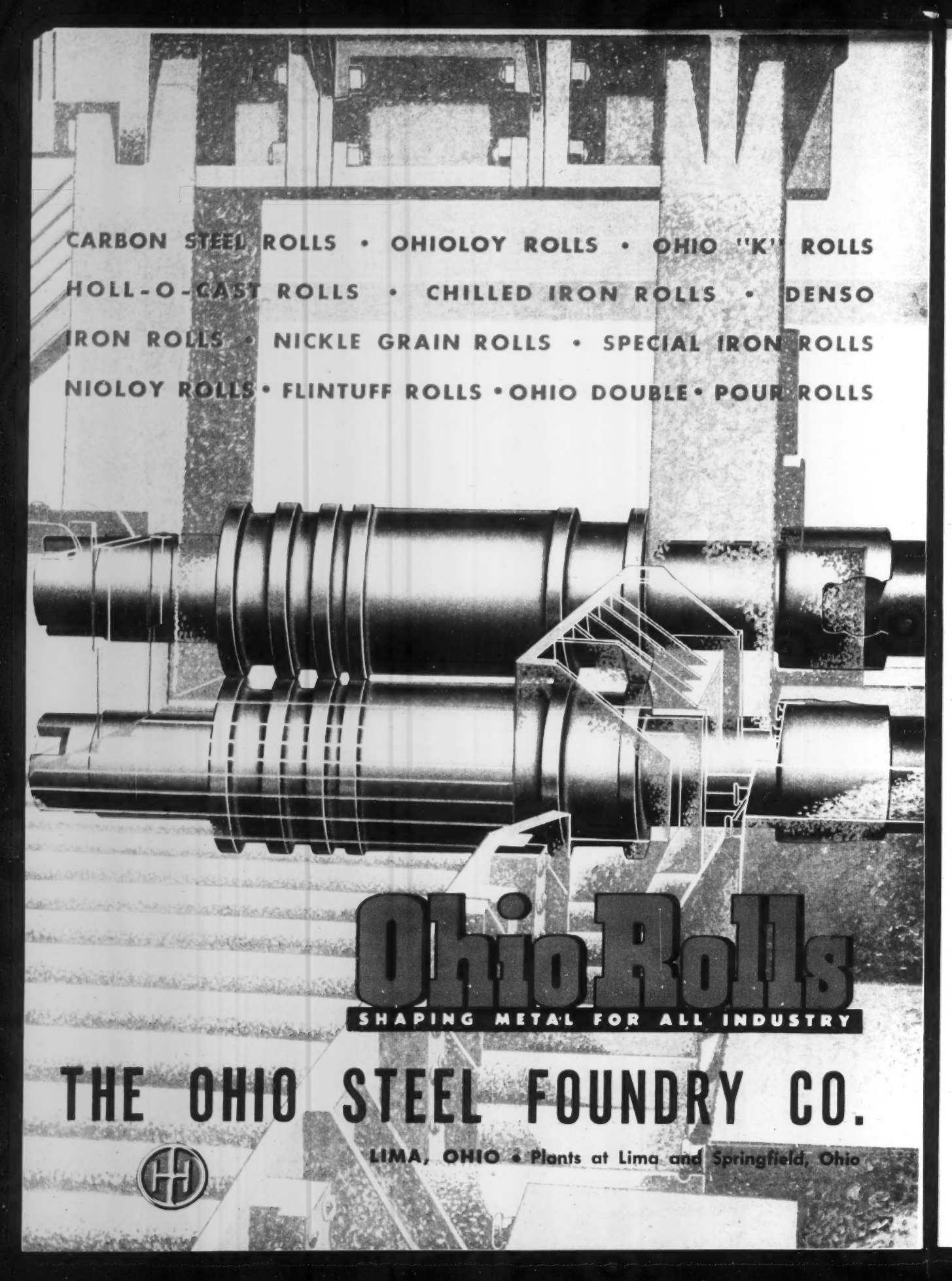
ALLIED

STEEL AND CONVEYORS, INC.

17353 HEALY AVE., DETROIT 12, MICH

Complete Material Handling Systems

Designed • Fabricated • Erected


CARBON STEEL ROLLS • OHIOLOY ROLLS • OHIO "K" ROLLS
HOLL-O-CAST ROLLS • CHILLED IRON ROLLS • DENSO
IRON ROLLS • NICKLE GRAIN ROLLS • SPECIAL IRON ROLLS
NIOLOY ROLLS • FLINTUFF ROLLS • OHIO DOUBLE • POUR ROLLS
Ohio Rolls
SHAPING METAL FOR ALL INDUSTRY
THE OHIO STEEL FOUNDRY CO.
LIMA, OHIO • Plants at Lima and Springfield, Ohio

Men of Industry

W. MONROE WELLS
. . . Reynolds assistant v. p.

W. Monroe Wells was named assistant vice president in charge of operations, **Reynolds Metals Co.**, Louisville. For the last three years he has served as general production control manager for the company with headquarters at its executive offices in Richmond, Va.

Everett W. Lundy was made assistant sales manager, **Peerless Pump Division,** Food Machinery & Chemical Corp., Los Angeles. Previously Pacific district manager for the pump firm, he is succeeded by **Robert H. Hull,** formerly Peerless' central district manager at Indianapolis. Mr. Hull is replaced by **Waldo T. Harman,** formerly Chicago branch manager.

William J. Thomas, general sales manager, was appointed general manager, tubular products division, **Babcock & Wilcox Co.,** Beaver Falls, Pa., and **Paul J. Utnehmer,** works manager, was named to the board of directors of the division.

P. C. Haldeman, general superintendent of the **Blaw-Knox Co.** rolls division at Pittsburgh, was promoted to works manager, Foote Construction Equipment Division at Nunda, N. Y. He is succeeded by **H. C. Stirling,** formerly production superintendent in charge of castings at the Lewis Machinery Division.

RALPH ZIMMERMAN
. . . NMB chief product engineer

Ralph Zimmerman, a product design engineer with **National Motor Bearing Co.,** Redwood, Calif., since 1942, was promoted to chief product engineer.

Harry V. Miles Jr., manager of filtration research and developments with **U. S. Hoffman Machinery Corp.,** has resigned to accept a position as assistant director of research and development with Oliver United Filters Inc., Oakland, Calif.

Townsend Co., New Brighton, Pa., appointed **Fred J. Schreiber Jr.** as director of commercial research. He was formerly manager of commercial research with National Tube Division, U. S. Steel Corp., at Pittsburgh.

Ralph C. Nelson was appointed purchasing agent of **Benjamin Electric Mfg. Co.,** Des Plaines, Ill., succeeding the late **L. W. Kester.**

Marcus L. Furrey resigned as purchasing agent, **Rockwell Register Corp.,** Bellefontaine, O. He is replaced by **E. B. Sulkoske.**

Arthur J. LeBlanc was made executive assistant to G. E. Ellsworth, president of **Toronto Iron Works Ltd.** and **Central Bridge Co. Ltd.,** Toronto. He has been engaged in Quebec-Labrador iron ore development for the last two years.

PAUL B. BROWN
. . . joins Peninsular Grinding Wheel

Paul B. Brown was appointed vice president and general manager, **Peninsular Grinding Wheel Co.,** Detroit. He has been actively associated with the grinding wheel industry for the last 28 years, having been with Norton Co. for 23 years in both sales and manufacturing and until recently was vice president, bonded products and abrasive grain division, at Carborundum Co.

Bryant Machinery & Engineering Co., Chicago, announces appointment of the following corporate officers: **Martin J. Wiora** president to succeed the late **Alexander G. Bryant, Charles B. Tansley** executive vice president, **Robert A. Cole** vice president, **Daniel F. Laffey** secretary, and **Martin J. Wiora Jr.** treasurer.

Clair S. Reed was elected vice president, director and a member of the executive committee of **United Metal Craft Co.,** Ypsilanti, Mich., subsidiary, Gar Wood Industries Inc. He joined Gar Wood a year ago as assistant to the executive vice president and continues in that capacity in addition to assuming his new duties.

Kenneth O. Swanson, auditor of Sharon Steel Corp., Sharon, Pa., was appointed secretary. He has served as general auditor since be-

coming connected with the company in 1944. In 1949 he was appointed assistant secretary.

William E. Johnson was appointed district representative in the Cleveland area for **Gisholt Machine Co.**, Madison, Wis.

Weirton Steel Co., division of National Steel Corp., Weirton, W. Va., appointed **A. G. Parks** assistant vice president for industrial relations and **Edward A. Ross** manager of industrial relations with duties covering all divisions of that department.

H. Arthur Howe, manager of General Electric Co.'s laminated plastics plant at Coshocton, O., since 1951, was promoted to manufacturing manager of the company's laminated and insulating products department. He continues headquarters and management at the Coshocton plant.

Theodore Jarvis was promoted to assistant chief engineer at **Ford Instrument Co.**, division of Sperry Corp. at Long Island City, N. Y. Mr. Jarvis, who is now responsible for engineering work connected with atomic energy projects, recently completed a year's study at the Oak Ridge School of Reactor Technology.

J. S. Fawcett was named director of **Fisher Scientific Co.'s** development laboratories, Pittsburgh.

Kenneth T. Fawcett was elected president of **Dominion Brake Shoe Co.**, subsidiary, American Brake Shoe Co., New York. **Thomas E. Akers**, former president, was elected chairman succeeding **Maurice N. Trainer**, who continues as president of the parent company. **Maynard B. Terry** was elected vice president.

Basic Refractories Inc., Cleveland, appointed **James W. Cameron** works engineer for its Maple Grove, O., quarrying and burning plant operations.

William D. Grimmer was promoted from assistant to manager of **American Can Co.'s** Pacific division closing machine department succeeding **F. Joujon-Roche** who transfers from San Francisco to become manager of Canco's closing machine department in New York, a newly created position.

F. J. DeCRANE

L. J. MILLER
. . . purchasing posts at Lamson & Sessions

F. J. DeCrane assumes the duties of director of purchases of **Lamson & Sessions Co.**, Cleveland, and **L. J. Miller** becomes purchasing agent. Mr. DeCrane succeeds **G. W. Hinds**, who after 36 years retired from the company Aug. 15. Mr. Miller succeeds Mr. DeCrane.

Harry B. Lilley was promoted to manager of **Timken Roller Bearing Co.'s** steel and tube division district office in Detroit. He was office manager for the division at Houston and is replaced there by **John J. McGrann.** Mr. Lilley succeeds **L. W. Eppler** who has resigned to start his own automotive parts manufacturing company. In the Milwaukee office of the division, **R. R. Hershey**, sales engineer, was transferred to the Detroit office and is replaced by **M. A. Conley**, former sales engineer at Cleveland.

Harrington-Wilson-Brown Co., Mt. Vernon, N. Y., appointed **Fred A. Milnes** as its press specialist. He will supervise and assist in the sales and service of the mechanical and hydraulic presses manufactured by Clearing Machine Corp. Mr. Milnes was formerly export manager and sales engineer of E. W. Bliss Co.

Carl F. Jensen was made plant manager of the Des Plaines, Ill., plant of the **Shakeproof Division**, Illinois Tool Works. Along with these duties, Mr. Jensen continues to be responsible for Shakeproof's special products engineering and sample parts operations located in Elgin, Ill.

John Tope was made assistant manager of the Washington office of **Republic Steel Corp.** He has been in sales work with Republic since 1936, for the last seven years in the Detroit sales office.

Donald H. Campbell was made comptroller of **Rigidized Metals Corp.**, Buffalo.

James H. Knapp Co., Los Angeles, appointed **J. B. Froblom** as a sales engineer to specialize in atmosphere control furnaces.

Glenn M. Brown, former president and general manager of Ryerson & Haynes Inc., was elected president and general manager of **Automatic Steel Products Inc.**, Canton, O. He continues as a director of the former company.

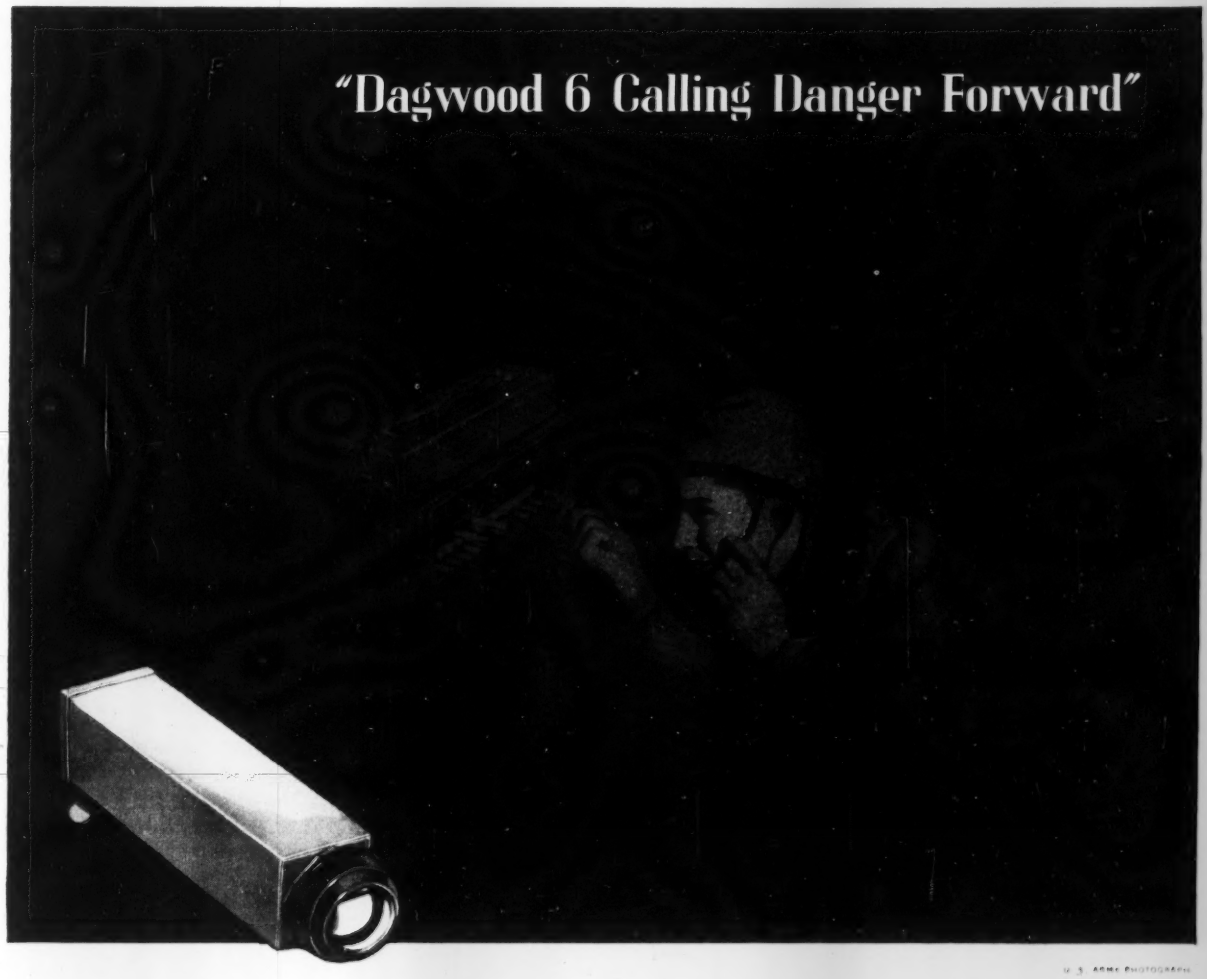
Earl Hayward was appointed superintendent of the Los Angeles plant of **Fisher Body Division**, General Motors Corp.

Luther Evans was appointed to the newly created position of director of industrial relations for all **Dow Chemical Co.'s** operations, with headquarters at Midland, Mich. He formerly headed industrial relations at the Texas division.

Airway Products Inc., Pontiac, Mich., appointed **H. R. Greenley** a vice president and general sales manager.

Joseph M. Halloran will represent **Ajax Engineering Corp.** in the New

"Dagwood 6 Calling Danger Forward"



U. S. ARMY PHOTOGRAPH

G.I. Joe now puts his calls through a new field switchboard twice the capacity and one-third the size of the one toted by his World War II counterpart.

The new "board" has a constitution that can winter in Rejkjavik, summer in Mombasa, and roll with a punch . . . just in case travel gets rough. Its retractable cords know when to come in out of the rain and goo.

Among the many essential parts of this instrument there is one named simply "SIGNAL, switchboard." It is a luminous-painted signal, operated by an electro-magnet, which "drops" into view when a line is calling. There's one "drop" for each telephone cord circuit; each drop is enclosed in a square housing made from Superior Hard Drawn Carbon Steel AISI C1008—.6815" I.D. Square, .020" wall, 2.656" long. Tolerances are close—±.005" on the length and +.007",—.000" on width.

Mr. Lloyd Bender, Vice President of The North Electric Manufacturing Company, makers of the switchboard, says of Superior, "Your performance has been excellent—in workmanship, quality of material and delivery."

Are you looking for a good small-tubing source—one that gives you the widest choice of tubing analyses available in America today, one that can supply you with one or one-million feet, one known for its uniformly high quality, and its interest in you and your tube problems? Try Superior. Superior Tube Company, 2005 Germantown Ave., Norristown, Pa.

Round and Shaped Tubing available in Carbon, Alloy, and Stainless Steels, Nickel Alloys, Beryllium Copper, and Titanium

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Certain analyses in Light Walls up to 2⅛" O.D.

England territory, handling the Trenton, N. J., company's line of low frequency induction furnaces.

Calvin J. Timmins joined the sales force of **J. Alex Gordon & Co.**, Detroit, representative of Automatic Transportation Co.

Eugene Malecki was named manager of the warehousing and shipping division of **Inland Steel Products Co.** at Milwaukee. He succeeds **Randall A. Burr**, transferred to the Baltimore branch plant as assistant manager.

John Gill was appointed assistant superintendent of the coke plant at the Midland, Pa., Works of **Crucible Steel Co. of America. M. A. Hurtt** was made operating practice engineer.

Charles H. Myers was made assistant to the manager of the mining department of **Mine Safety Appliances Co.**, Pittsburgh. Formerly a mining sales engineer in the Fairmont, W. Va., area, he is replaced in that territory by **M. E. Condit.**

New supervising engineers appointed in the engineering department at **Caterpillar Tractor Co.**, Peoria, Ill., are **Donald E. De Canniere** to supervise work with bulldozers and cable controls and **John A. Junck** to supervise work on hydraulic controls and tool bars. These two sections, plus the section which includes scrapers, wagons and ripper design supervised by **Woody Kimsey**, will be under the direction of **Carl Kepner**, recently appointed assistant chief engineer.

Henry A. Snow was appointed abrasive engineer for **Abrasive Products Co.**, Westboro, Mass., to cover Maine, New Hampshire and Vermont.

Perfection Stove Co. appointed **H. C. Erhard** sales manager of its Jersey City, N. J., sales district to succeed **W. B. Gathings**, transferred to the home office in Cleveland as assistant to the sales manager, appliance division. **H. E. Thomas** becomes manager, contract sales department, to succeed Mr. Erhard.

Horace D'Angelo will resign Oct. 15 as executive vice president and general manager, **Harry Ferguson Inc.**, Detroit.

HAROLD O. SMITH
. . . heads Mullins plant operations

Mullins Mfg. Corp. appointed **Harold O. Smith** general manager of operations for its plants in Salem and Warren, O. He was works manager of the former plant and remains as acting works manager. **A. F. Boone** was named assistant sales manager, contract division, and **A. P. Schmauch** as chief industrial engineer.

James J. Sherry Jr. joined **Buick Motor Division**, Flint, Mich., General Motors Corp., as an assistant director of purchases. He has been with GM since 1936 and previously served as assistant director of purchases in its purchasing and salvage section.

Atlas Chain & Mfg. Co., Philadelphia, division of Prudential Industries Inc., appointed **Orville W. Schmidt** as general sales manager. A member of the Atlas organization since 1948, he was most recently the midwest district sales manager with offices in Chicago.

Charles F. Pittman, assistant to the manager of **General Electric Co.'s** industry sales section, Schenectady, N. Y., retired after 42 years' service.

George C. Murphy was made general manager of **Heilman Co.**, Allentown, Pa.

Field engineers appointed by **Norton Co.** include **Burton G. Ebbeson** to the Worcester, Mass., area and **Charles M. Wellons** to work out of the Philadelphia district office.

LEO A. WISE
. . . American Safety Razor purchasing post

American Safety Razor Corp., Brooklyn, N. Y., appointed **Leo A. Wise** director of purchasing. With the company for 33 years, he became purchasing agent in 1947.

Frank P. Cullen was elected president, **Cullen-Friestedt Co.**, Chicago. He succeeds his father, the late **F. J. Cullen. Edward V. Cullen**, a vice president, also assumes the position of secretary. In other changes **H. M. McFarlane**, sales manager, was named vice president in charge of sales; **Karl J. Biller**, assistant secretary, was named a vice president and treasurer; and **James Kudrna** was made assistant secretary.

N. J. Cavalier was made Pacific Coast manager of **Truscon Steel Division**, Republic Steel Corp., with headquarters in Los Angeles. He succeeds **G. R. Roden**, made manager of sales, Engineering Window Products, at Youngstown.

James A. Holland was transferred from the Detroit branch office of **Bay State Abrasive Products Co.** to the southern California area with headquarters at Republic Supply Co. of California, company distributor.

K. L. Carver was elected a member of the board of directors of **Plomb Tool Co.**, Los Angeles.

Vice Adm. John B. Moss (U. S. Navy, ret.), was appointed a consultant for **Bell Aircraft Corp.**, Buffalo. He will work between

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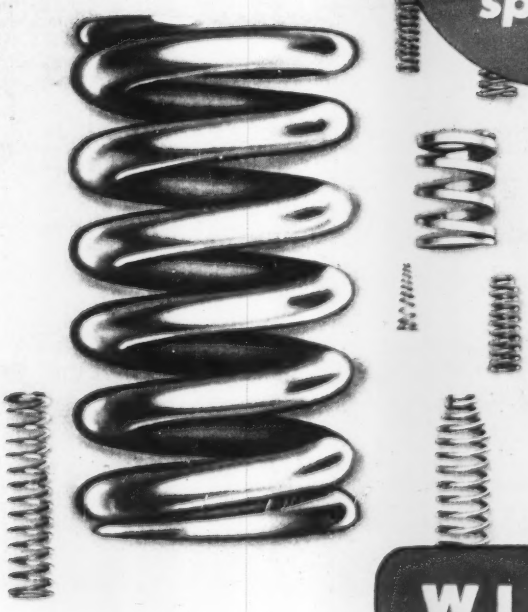

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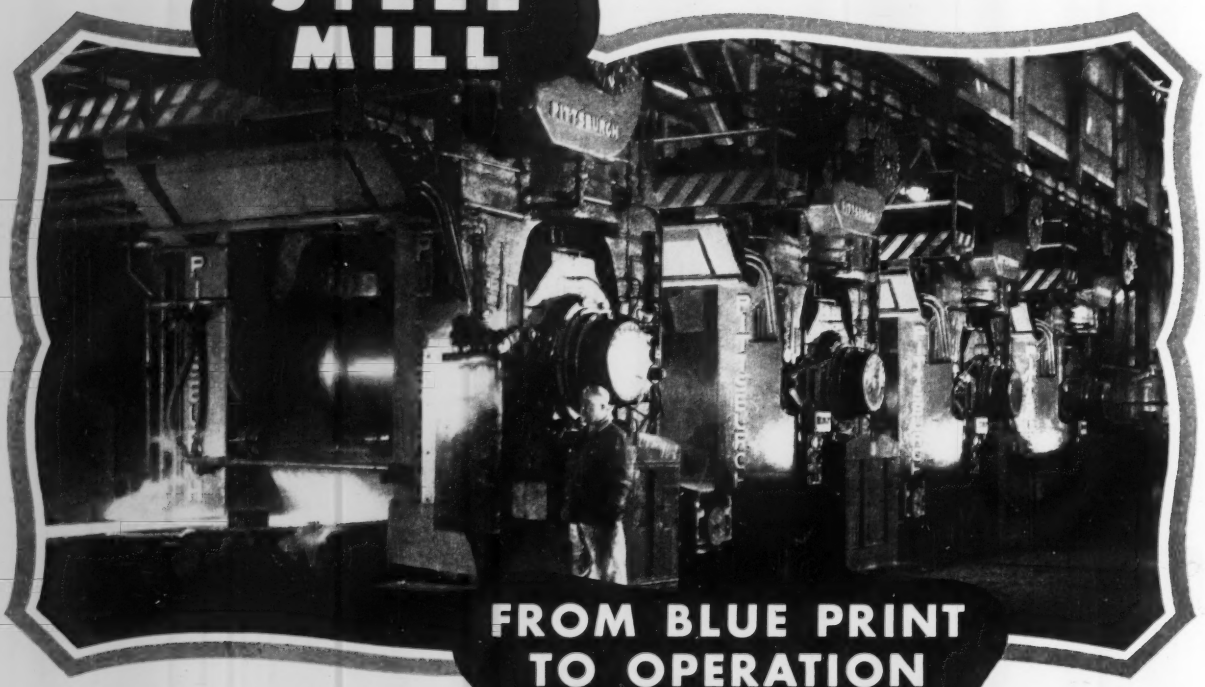

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We specialize in the complete design and installation of modern mill machinery that will work harder with less maintenance resulting in greater economy of operation. Our facilities include engineering and manufacturing from *Blueprint to Operation* with *undivided responsibility.*

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ARTHUR E. HILLS
. . . new post at Cleveland Hardware

SEWARD H. FRENCH JR.
. . . Crucible Steel vice president

the company's Niagara Frontier Division and the Texas Division.

Arthur E. Hills was appointed sales manager, die casting division, **Cleveland Hardware & Forging Co.**, Cleveland.

Raymond P. Scheibel was made planning superintendent of the manufacturing division of **Jefferson Electric Co.**, Bellwood, Ill.

Fred C. Martin was made comptroller, **Dodge Division**, Chrysler Corp., Detroit.

Brig. Gen. Merle H. Davis, who retired last month as chief of the Industrial Ammunition Branch, Army Ordnance, was appointed manufacturing and engineering consultant for **Clary Multiplier Corp.**, with headquarters at the San Gabriel, Calif., plant.

Seward H. French Jr. was appointed vice president of **Crucible Steel Co. of America**, Pittsburgh, in charge of industrial and public relations for the company. He joined Crucible in 1947 as assistant to the president in charge of those activities.

Thomas H. Sheehan was promoted to manager of manufacturing of **Houdaille-Hershey Corp.**, Detroit. **Charles B. Eisenhauer**, formerly manager of manufacturing, was assigned staff assistant to Frank G. Fisher, vice president and general manager.

E. M. Braden was made general sales manager, **Chrysler Division**, Chrysler Corp., Detroit. For the last three months he was director of regions.

James B. Duke joined **Elastic Stop Nut Corp. of America**, Union, N. J., as technical assistant to the general sales manager. He was formerly with Hamilton Standard Division, United Aircraft Corp.

Harbison-Walker Refractories Co., Pittsburgh, appointed **P. B. Weaver** assistant to the general sales manager.

Gearld E. Hauer was elected vice president-engineering for **American Well Works**, Aurora, Ill.

J. J. Smith was named manager of plant facilities at Schenectady, N. Y., for **American Locomotive Co. Wallace H. Allison**, general superintendent of the locomotive division plant, was appointed manager. **W. L. Larson** becomes general plant manager of the Dunkirk, N. Y., and Beaumont, Tex., plants.

F. J. Wilson retired as assistant purchasing agent and steel buyer of **Electric Auto-Lite Co.**, Toledo, O.

Richard A. Ellis was made assistant district manager of the Hamilton, Ont., branch warehouse and sales district of **Atlas Steels Ltd.**

John E. McNeil was made western district sales manager, **Delco Products Division**, General Motors Corp. He has headquarters in Los Angeles.

John P. Clifford, vice president, **Richardson Scale Co.**, Clifton, N. J., retired after almost 50 years of company service. He will continue as a consultant.

Jack E. Lawson will head sales in the Detroit area of **Circo Equipment Co.**

OBITUARIES . . .

William M. Myers, 69, president, **Penn Steel Castings Co.**, Chester, Pa., died Sept. 7.

August O. Elting, 60, president, **Albany Steel & Brass Corp.**, Chicago, died Sept. 1.

Jacob S. Stern, 70, who retired in 1945 as head of **Modern Die Casting Corp.**, Chicago, died Sept. 1.

Henry Bartling, 60, application engineer of the metal industries group of **Allis-Chalmers Mfg. Co.'s** motor and generator section, Milwaukee, died Aug. 21.

Curtis W. McGraw, 57, president and chairman of the board of **McGraw-Hill Publishing Co. Inc.**, New York, died Sept. 10.

T. W. Bell, 75, formerly sales manager in the Los Angeles area for **Jones & Laughlin Steel Corp.**, died Sept. 4.

Carleton Reynell, 68, former executive purchasing officer and traffic manager, **Worthington Corp.**, Harrison, N. J., died Sept. 7. He retired last May after 20 years with the corporation.

J. J. Siefen, 78, founder and president of **J. J. Siefen Co.**, Detroit, died Aug. 23.

Leonard W. Harston, 64, until retirement in 1945 sales manager of **Republic Steel Corp.'s** steel and tube division, Cleveland, died Sept. 9 at his home in Shaker Hts., O.

Roy F. Johnson, 60, manager, sales and service engineering, **Pullman-Standard Car Mfg. Co.**, Chicago, died Sept. 6.

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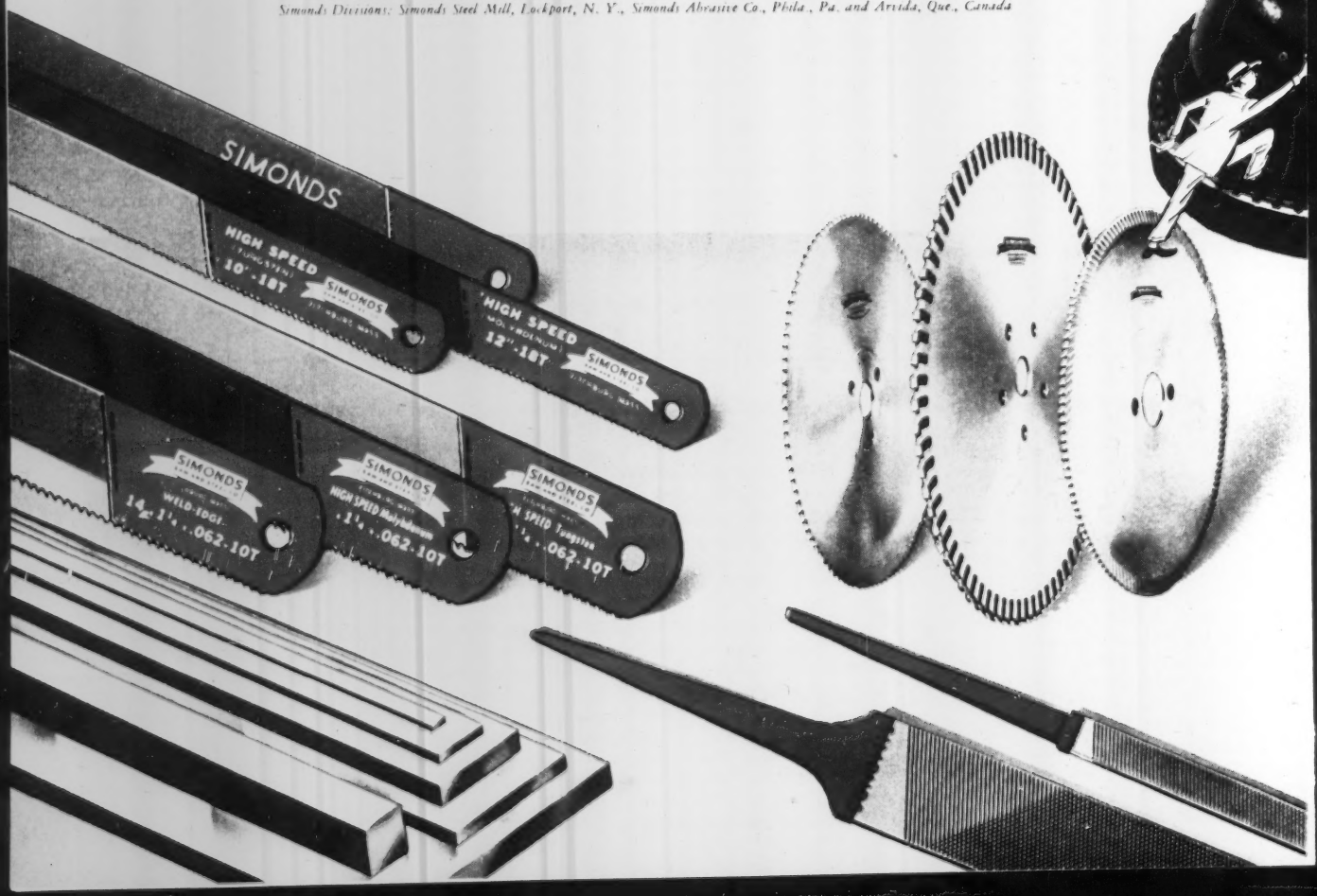

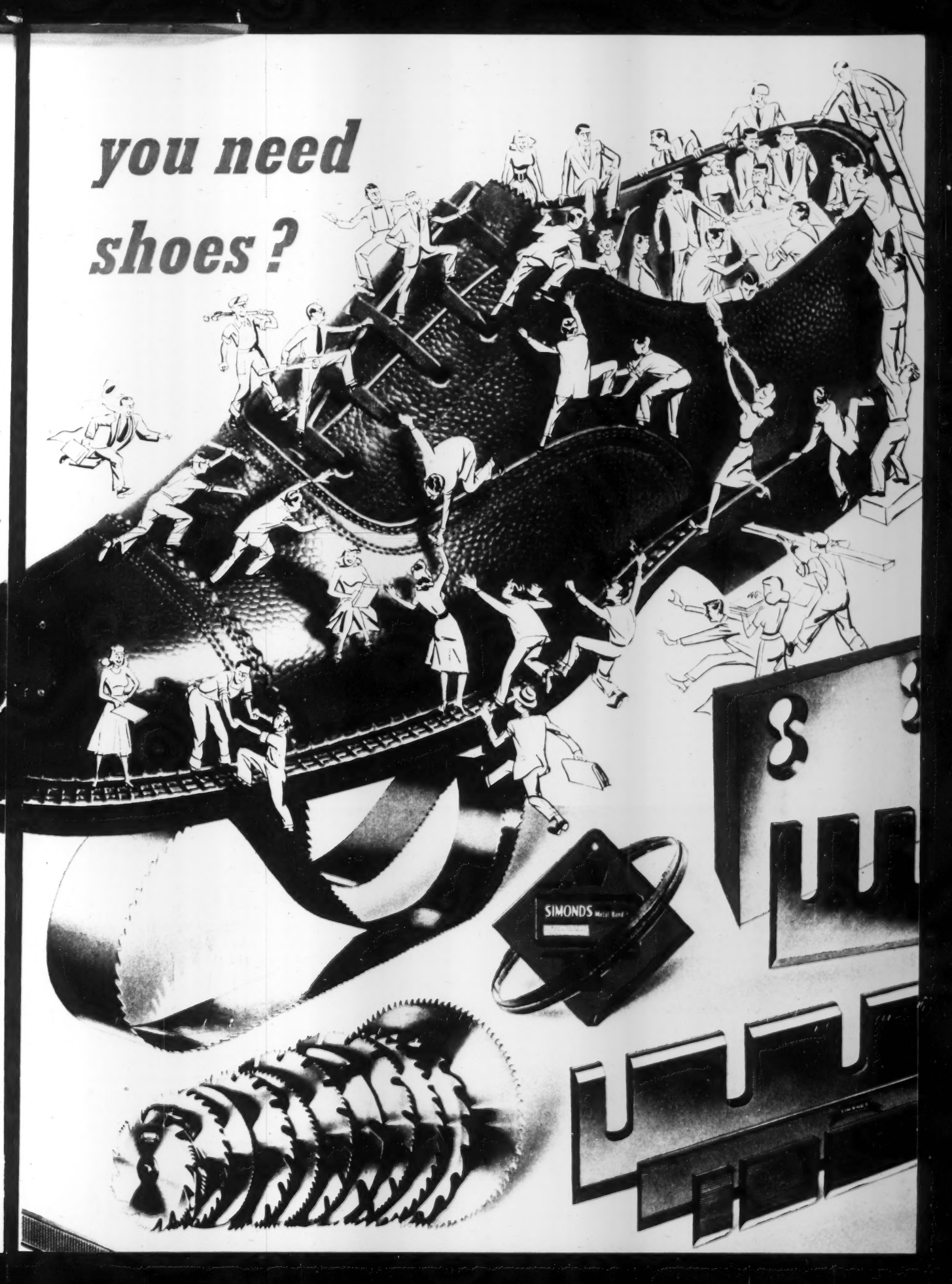
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Canadian Foundry Opened

Entire output of Canada Iron Foundries' new facility will be sold to steelmakers

A FOUNDRY capable of turning out cast iron ingots ranging in weight from 3 to 16 tons was opened officially by Canada Iron Foundries Ltd., Montreal, Que., on Sept. 17.

Dignitaries from the steel industry and from civic circles toured the plant at Burlington street and Kenilworth avenue, Hamilton, Ont.

The highly mechanized foundry has a minimum daily production of 400 tons. The ingots are made both from cupola metal, which is melted on the premises, and from blast furnace metal which is transported in a molten form from Dominion Foundries & Steel Ltd.'s nearby plant.

The foundry's entire turnout will be sold to Canadian steel-producing companies.

AEC To Build Uranium Plant

A $3 million uranium processing plant will be constructed at Shiprock, N. Mex., by the Atomic Energy Commission.

Eastern To Make Floor Plate

Eastern Stainless Steel Corp., Baltimore, has purchased machinery from Alan Wood Steel Co., Conshohocken, Pa., in order to roll stainless steel Diamondette floor plates at its mill. This type of floor plate will be rolled exclusively at Eastern Stainless Steel's plant.

Holden Purchases Equipment

A. F. Holden Co., New Haven, Conn., purchased the physical assets of Cook Heat Treating Corp., Los Angeles. These assets include 45 furnaces for all types of industrial and commercial heat treating applications plus sandblasting and vapor blasting facilities, testing equipment and four delivery trucks. This business will be managed by Cook Heat Treating Inc., a Nevada corporation, as a wholly-owned subsidiary of A. F. Holden Co. Officers of the subsidiary are: H. G. Howell, president; G. A. Zellmer, vice president and general manager; J. B. Carey, vice president; A. F. Holden, treasurer; J. Phillip Nevins, secretary. The parent company manufactures salt baths, electrode furnaces and conveyors.

Metal Powder Firm To Move

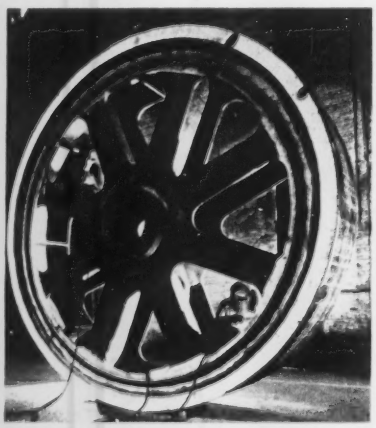
Metal Powder Products Inc., Dayton, O., will move to a plant now under construction in Logan, O. The move will be completed within the next few months. Founded in 1946, the firm makes bearings, bushings, gears and cams out of metal powder.

Brainard Rivet Enlarges Plant

Brainard Rivet Co., Girard, O., is building a plant addition which will contain 6000 sq ft of manufacturing space.

Production Pool Organized

Albuquerque Production Pool Inc., Albuquerque, N. Mex., has been approved as a small-business defense production pool with the following members: Acoma Corp., Anderson Mfg. Co., Benischek Mfg. Co., W. L. Childers Welding & Machine Works, Consolidated Machine & Supply Co. Ltd., Crown Engineering, Gaddis Machine Works, Machine Engineering Corp., M. & F. Equipment Co., Mallow Plating & Mfg. Works, Quality Wood Shop, and Troy's Welding Shop, all of Albuquerque; Sun Country Industries, Alameda, N. Mex.



Giant Sheave Takes Form

Forging, rolling and welding played a part in manufacture of four sheaves for the $6-million vertical-lift bridge to Welfare Island, New York. Each sheave, as shown above, weighs 37 tons and is 15 ft in diameter. Hub was forged on a 2500-ton press and center-bored to an inside diameter of 22 in. at Bethlehem Steel Co.'s plant

Hydropress To Export Mill

A complete aluminum foil rolling mill installation of the Hydromil design is being supplied by Hydropress Inc., New York, to Takada Aluminum Co., Osaka, Japan.

Simmons Machine Names Agent

Simmons Machine & Tool Corp., Albany, N. Y., appointed Clare Perlin & Associates, Park Ridge, Ill., as its midwestern representatives. The Simmons line comprises large boring and facing mills, and lathes up to 72 in. swing, as well as machine tool reconditioning service.

Latrobe Steel Opens Branch

Latrobe Steel Co., Latrobe, Pa., opened its branch office and warehouse at 741 Ramsey Ave., Hillside, N. J. These facilities are under the supervision of W. J. Kennelly, district manager, and include the sales office formerly located at 40 W. 40th St., New York.

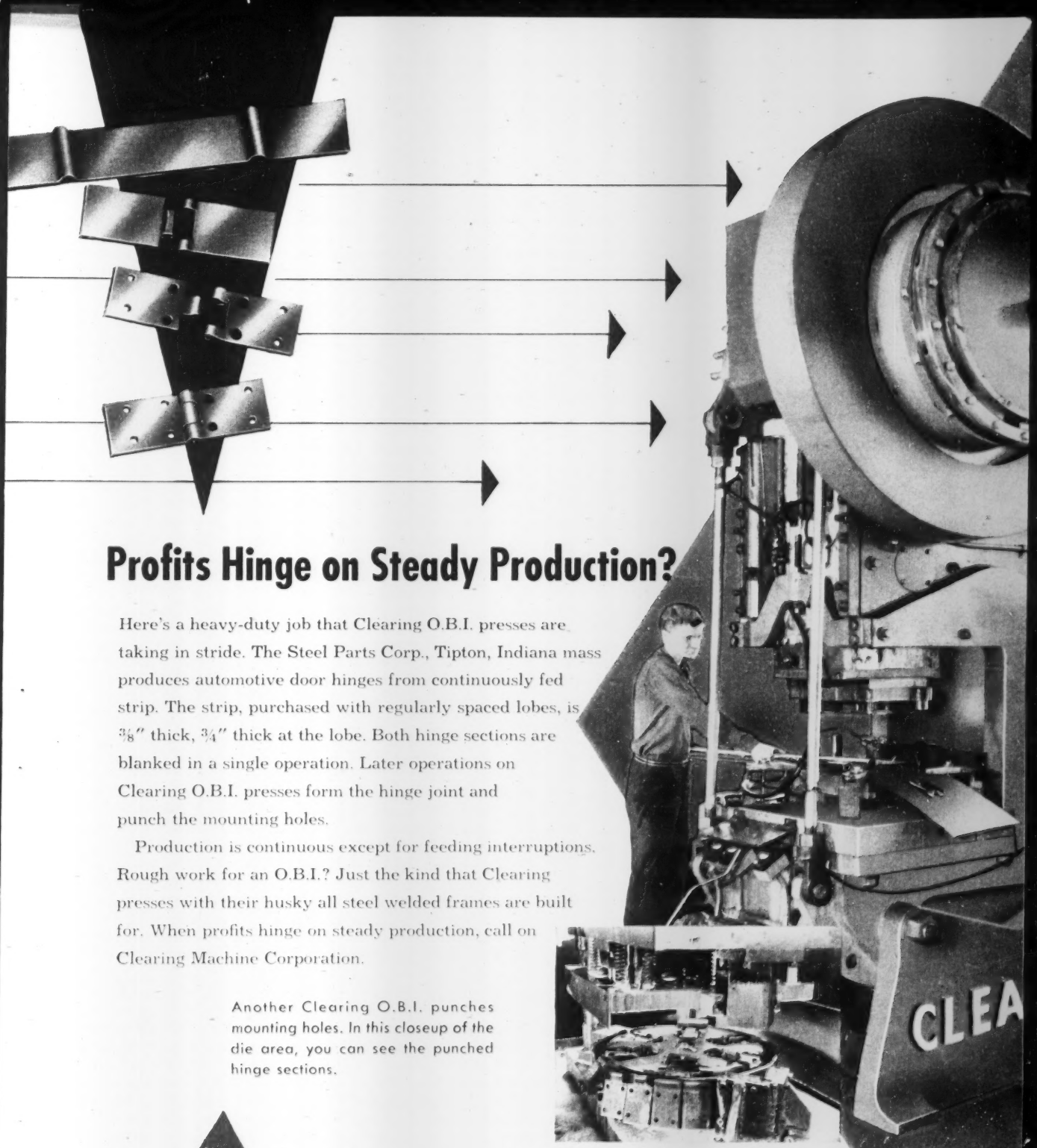
Bristol Completes Project

Bristol Co., Waterbury, Conn., completed an expansion program which increases its capacity to manufacture multiple-spline and hex socket screws. New facilities include a building and precision equipment for manufacturing and heat treating socket screws. The firm's capacity to turn out socket cap screws in particular has been greatly expanded.

Rockwell Mfg. Leases Plant

Rockwell Mfg. Co., Pittsburgh, leased a plant adjacent to its Homewood plant in Youngstown to provide more space for increasing production of tools. The building was owned by Lawson Mfg. Co. which is moving to New Kensington, Pa.

Rockwell's Crescent Machine Co. plant at Leetonia, O., recently was closed after a long labor dispute and efforts are being made to sell it. Plans at Homewood call for making some of the Crescent line there, as well as some other tools. Meanwhile, Enterprise Co., Colum-



Profits Hinge on Steady Production?

Here's a heavy-duty job that Clearing O.B.I. presses are taking in stride. The Steel Parts Corp., Tipton, Indiana mass produces automotive door hinges from continuously fed strip. The strip, purchased with regularly spaced lobes, is $\frac{3}{8}$" thick, $\frac{3}{4}$" thick at the lobe. Both hinge sections are blanked in a single operation. Later operations on Clearing O.B.I. presses form the hinge joint and punch the mounting holes.

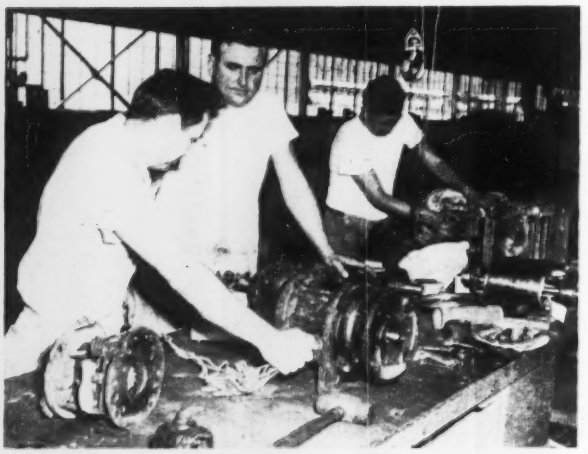
Production is continuous except for feeding interruptions. Rough work for an O.B.I.? Just the kind that Clearing presses with their husky all steel welded frames are built for. When profits hinge on steady production, call on Clearing Machine Corporation.

Another Clearing O.B.I. punches mounting holes. In this closeup of the die area, you can see the punched hinge sections.

CLEARING PRESSES

THE WAY TO EFFICIENT MASS PRODUCTION

CLEARING MACHINE CORPORATION, 6497 West 65th St., Chicago 38, Illinois • HAMILTON DIVISION, Hamilton, Ohio



Delco Reconditioning Motors Damaged in Livonia, Mich., Fire

Delco Products Division, General Motors Corp., is devoting part of its facilities and manpower to repair electrical motors damaged in the fire at Livonia, Mich. At left above, fire-damaged motors roll-in, while at right, workers are shown inspecting a few of them to determine where to start in on the task of reconditioning them for Detroit Transmission Division. STEEL, Aug. 31, p. 44, incorrectly stated that Delco-Remy Division was doing the repair job

biana, O., has bought rights to make planer and band saw lines under the Crescent trade name.

Attica Plant To Make Parts

Westinghouse Electric Corp.'s plant at Attica, N. Y., which has been building industrial stokers, will become a branch plant of the firm's Motor & Control Division whose main plant is in Buffalo. The Attica plant will produce parts for electric motors and some other products. Stoker work at the plant should be finished by Sept. 30 and production of the new items should be in full production within six to eight months after that date.

American Chain Moves Plant

American Chain & Cable Co. Inc., Bridgeport, Conn., will move its Los Angeles plant to 2216 S. Garfield Blvd., that city. The firm manufactures aircraft cable assemblies, wire rope stock, chain welding rods, cables and aircraft terminals.

Pierson Opens Warehouse

R. J. Pierson, former vice president of Barry Steel Corp., Detroit, opened a steel warehouse at Glendale, O. The warehouse will operate under the name of Gateway Steel & Supply Co. and will process and distribute flat rolled steel products in the Cincinnati area.

Plans Materials Handling Clinic

Second in a series of traveling clinics on materials handling scheduled for 1953 by Material Handling Institute, Pittsburgh, will convene Oct. 2 at Sheraton-Plaza Hotel, Boston, at the request of and in co-operation with the New England chapter, American Material Handling Society. Purpose of the clinic is to develop among users a better understanding of the correct application of materials handling equipment to industry's most pressing problems.

Institute Builds Laboratory

Construction has begun on a $1.4 million laboratory building to house chemical research at Battelle Memorial Institute, Columbus, O. Dr. Clyde Williams is president.

Erie Resistor Expands Plants

Erie Resistor of Canada Ltd., a wholly-owned subsidiary of Erie Resistor Corp., Erie, Pa., will construct a plant at Trenton, Ont.

The plant will contain 21,000 sq ft of floor space and will be four times as large as Resistor's present Canadian location in Toronto, Ont. Resistor's Canadian subsidiary plans to sell its present Toronto location when the new plant is finished.

Recent expansion of the Erie Resistor Corp. includes a 60,000 sq ft plant in Holly Springs, Miss., and the purchase of new equipment for improvements in the plants at Erie. Erie Resistor's English subsidiary is constructing a building for increased manufacturing at its location in Great Yarmouth, England.

Another expansion under consideration by Resistor's top management is establishment of a plant for manufacturing electronics products in Australia. It is anticipated that this plant will be financed and managed by Erie Resistor Ltd. of England.

Electrotechnic Changes Hands

Electrotechnic Corp., Azusa, Calif., was purchased by Telautograph Corp., New York. Electrotechnic will operate as a wholly-owned subsidiary for the manufacture of communication control systems.

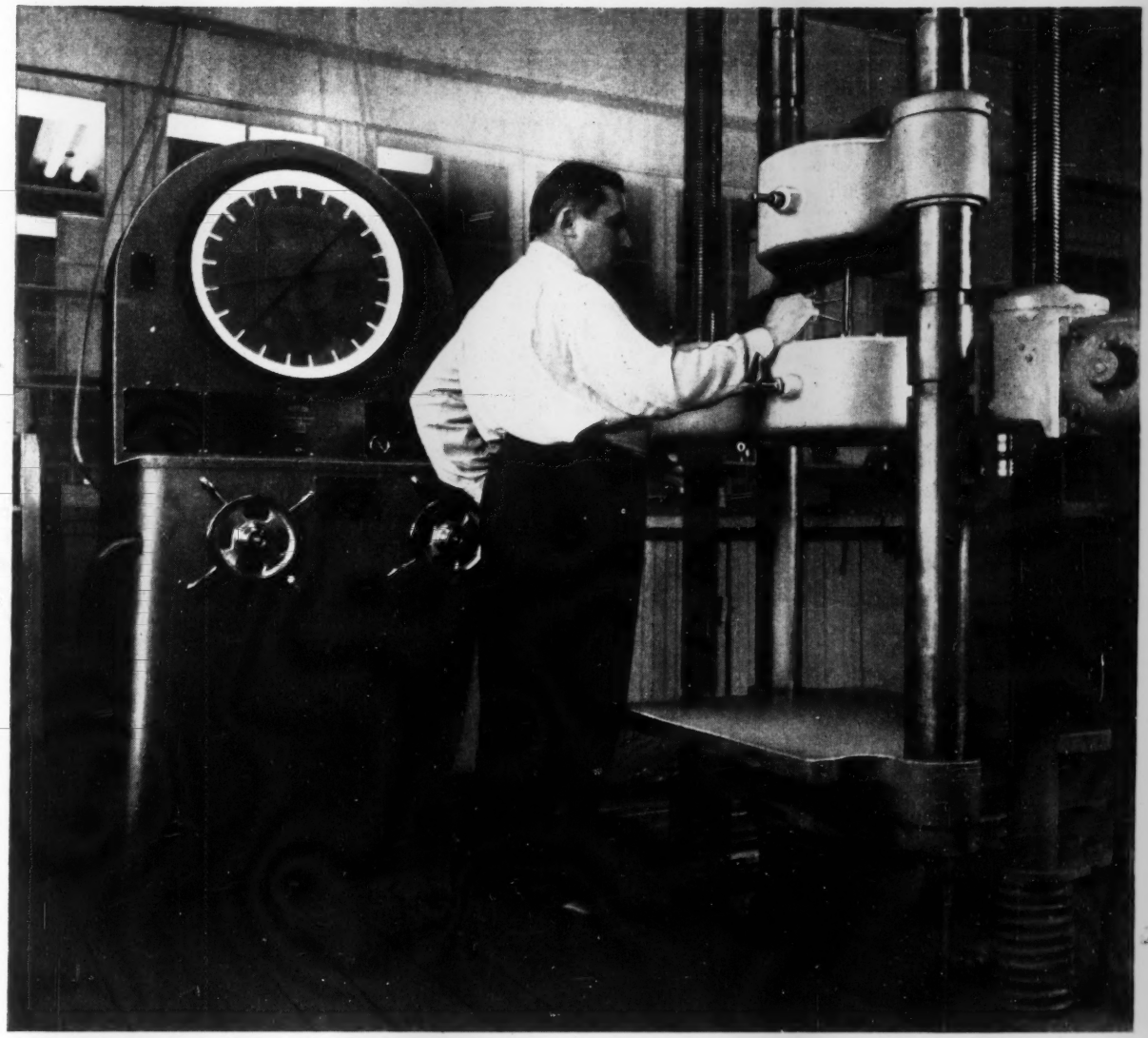
Trevor Enlarges Warehouse

Trevor Steel Co., Center Line, Mich., is doubling the size of its warehouse facilities as well as enlarging its offices. Russell F. Trevor is president.

Castings Firm Appoints Agent

Alloy Precision Castings Co., Cleveland, appointed Industrial Products Sales Inc., Akron, as its field sales engineer for Ohio and

(*Please Turn to Page* 121)



How Much Can a Tough Tube Take?

Plenty, if you're talking about cold drawn seamless *steel* hydraulic tubing by Summerill. For we know how vital hydraulic tube performance can be. Whatever the product you're making—machinery, jet engines, power transmission equipment, instruments or brakes—you've got to be sure that the tubing you use *never fails.*

That's why we actually pull apart sections of Summerill tubing many times a day . . . subject it to extreme hydraulic pressures and sharp angle bends . . . and go over every piece of tubing we ship with a micrometer to check its uniform dimensions. It's all part of the close quality control we exert to make sure Summerill hydraulic tubing does a *better* job in your product.

Let us show you how you can improve safety factors, maintain easy fabrication and eliminate on-the-job failures with *steel* tubing.

● *Summerill Tubing Company Div., Columbia Steel & Shafting Company, Pittsburgh 30, Pa.*

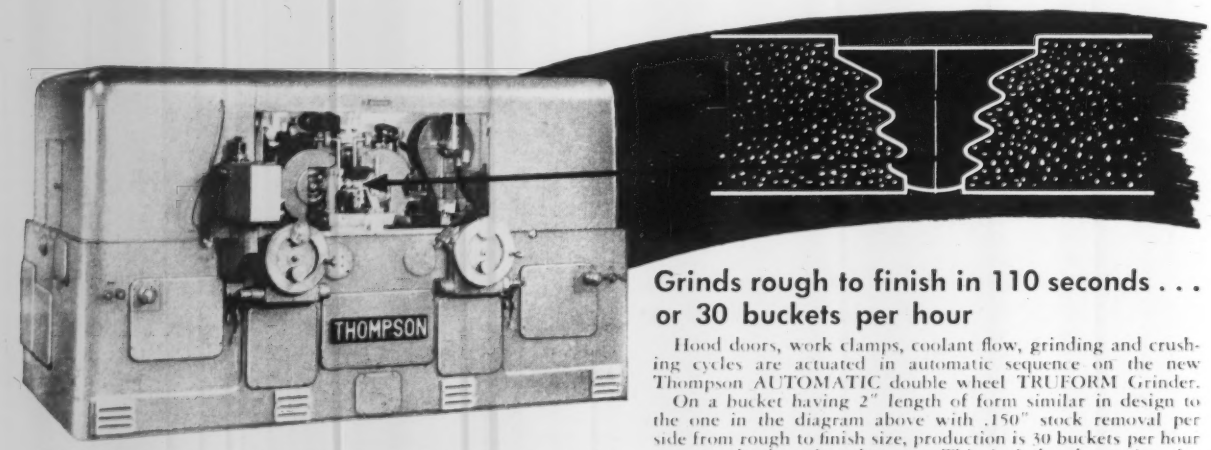
WSD 4559

IN COLD DRAWN SEAMLESS STEEL TUBING

SPECIFY *Summerill* AND BE SURE!

New Thompson AUTOMATIC double wheel TRUFORM Grinder speeds jet engine production

GRINDS BOTH SIDES OF JET TURBINE BUCKETS OR BLADES SIMULTANEOUSLY IN A SINGLE SETTING

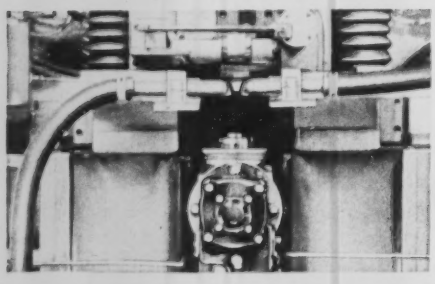


To grind root sections on gas turbine buckets with greatest accuracy and productivity, Thompson developed this new AUTOMATIC double wheel TRUFORMING machine featuring simultaneous grinding of both sides of root section with one setting of work.

Grinds rough to finish in 110 seconds . . . or 30 buckets per hour

Hood doors, work clamps, coolant flow, grinding and crushing cycles are actuated in automatic sequence on the new Thompson AUTOMATIC double wheel TRUFORM Grinder.

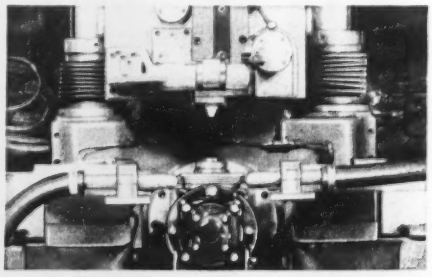
On a bucket having 2" length of form similar in design to the one in the diagram above with .150" stock removal per side from rough to finish size, production is 30 buckets per hour at a steady day after day rate. This includes down time for dressing, regrinding the crusher roll, initial machine warm up period, wheel changing and diamond changing. Actual machine time from rough forging or casting to finish is 104 seconds plus 6 seconds for loading and unloading time . . . makes total time floor to floor 110 seconds per piece.



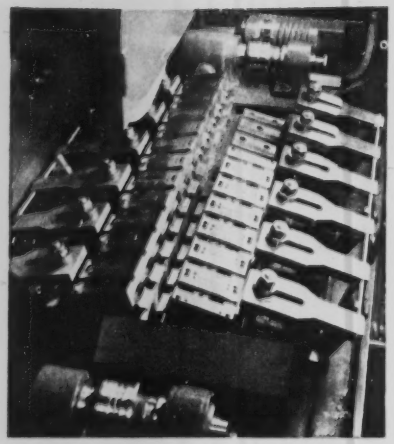
FOR ABSOLUTE SYMMETRY BOTH WHEELS ARE DRESSED FROM A SINGLE CRUSHER ROLL

GRINDING POSITION

CRUSHING POSITION

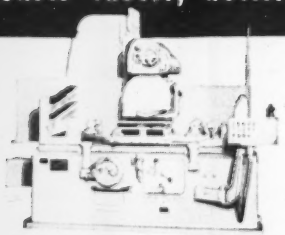


Standard THOMPSON TRUFORM Machines also grind jet buckets faster, better



By means of multiple grinding of jet turbine buckets the standard TRUFORM Grinders still offer high production plus many advantages such as flexibility of standard machine design and lower first cost. Although compared to the new AUTOMATIC the standard TRUFORM requires more skillful set up and tooling.

Typical tooling on Type "C" TRUFORM producing 24 buckets per hour. Type "B" TRUFORM produces 18 parts per hour.



Thompson Type "C" TRUFORM

FOR COMPLETE DETAILS WRITE TODAY

The Thompson Grinder Co.
Springfield, Ohio

Thompson SURFACE Grinders

(*Continued from Page* 118)
Michigan. Industrial Products Sales, with branch offices in Dayton, O., and Detroit, handles castings, forgings, stampings, fasteners and welded steel tubing.

New Firm To Make Castings

A group of former officials and shareholders of Falcon Bronze Co. are organizing a new firm in Youngstown to make brass, bronze and copper castings for the steel industry. The group is headed by L. M. Nesselbush, former president of Falcon Bronze which quit business recently as a result of a prolonged strike by United Steelworkers of America, CIO. Falcon sold its properties and business to American Brake Shoe Co., New York. The new firm has worked out an agreement with the union and is exercising an option on Harris Fabricating Co.'s plant at Lowellville, O.

Rice & Adams Halts Operations

Rice & Adams Equipment Division, Pressed Steel Car Co. Inc., Buffalo, halted manufacturing operations. The firm is a pioneer manufacturer of dairy equipment and was founded in the 1890's. It was purchased by Pressed Steel Car Co. Inc., Chicago, in 1950.

A company announcement said that the Rice & Adams operation has been profitable, but that Pressed Steel Car is now centering its major operations in Chicago and on the West Coast. A spare parts operation will be continued indefinitely at the Buffalo plant, but it was indicated Pressed Steel Car will sell this limited phase of its operations if a buyer can be found.

Equipment Maker Builds

S & C Electric Canada Ltd., a new company which is associated with S & C Electric Co., Chicago, is completing a plant in the Toronto, Ont., area. The plant will have 20,000 sq ft of floor space and will manufacture power fuses, load-break switches, cutouts and metal-clad switchgear. These products have been produced in Toronto for many years through a manufacturing arrangement with a Canadian company.

Willys Buys Firm

Chase Aircraft, a wholly-owned subsidiary, will continue to make airplane parts

Chase Aircraft Co., West Trenton, N. J., became a wholly-owned subsidiary of Willys Motors Inc., Toledo, O., with purchase by the latter firm for $1,690,000 from Michael Stroukoff of his 51 per cent interest in Chase. Willys acquired the initial 49 per cent stock interest from Henry J. Kaiser Co. at the time of the purchase of Willys-Overland assets by Kaiser Mfg. Corp. and the change of that company's name to Willys Motors Inc. on Apr. 28.

Chase will continue in business at its present location, making airplane parts. Officers of Chase are: Clay P. Bedford, president; William A. Cannon, vice president and treasurer; H. E. Ryker, vice president and general manager of the West Trenton Division.

Mr. Stroukoff has formed a new company, Stroukoff Aircraft Corp., which has an option to purchase some of the properties of Chase and to take over leases and other properties. A research and development contract held by Chase may be transferred to Stroukoff Aircraft.

Continental Can Forms Division

Continental Can Co.'s two recent acquisitions, Benjamin C. Betner Co. and Shellmar Products Corp., have been consolidated into the company's new Shellmar Betner Flexible Packaging Division. Benjamin C. Betner Jr. is in charge of operations for the new division with headquarters in Mt. Vernon, O., former main office of Shellmar. Division plants are located in Mt. Vernon and Zanesville, O.; Appleton, Wis.; Devon, Pa.; Richmond, Va.; Columbus, Ga.; Beaumont and Paris, Tex.; Los Angeles and South Gate, Calif. In addition there are five former Shellmar plants in Latin America and affiliates in other foreign countries.

Stevens Opens Warehouse

Frederic B. Stevens Inc., Detroit, opened a customer service warehouse in Springfield, O., to be operated in conjunction with the firm's plant in that city. The company makes metal finishing equipment and supplies for the foundry industry.

Standard Tool Expands

Standard Tool & Mfg. Co., Detroit, designer and manufacturer of special machine tools, added 2000 sq ft of floor space to its assembly department. George C. Steyskal was appointed factory manager; D. A. Tyo Jr., plant superintendent. Oscar M. Bates continues as office manager and purchasing agent.

Scrap Companies Unite

Continental Iron & Steel Co., New York, is now affiliated with Southwest Steel Corp., Pittsburgh. Both firms are engaged in the scrap business. With the same personnel, the New York firm will continue operations under the name of Continental Iron & Steel Co. Division of Southwest Steel Corp.

Will Make Stretch Form Block

Hufford Machine Works Inc., El Segundo, Calif., will manufacture and market a flexible stretch form block developed by Northrop Aircraft Inc. Used as a machine attachment with stretch presses, the form block provides a flexible and economic method of producing small preproduction-run quantities of curved sections. It was designed originally for use with an A10 Hufford stretch press but is adaptable for use with other existing types of stretch press equipment.

X-ray Maker Names Dealer

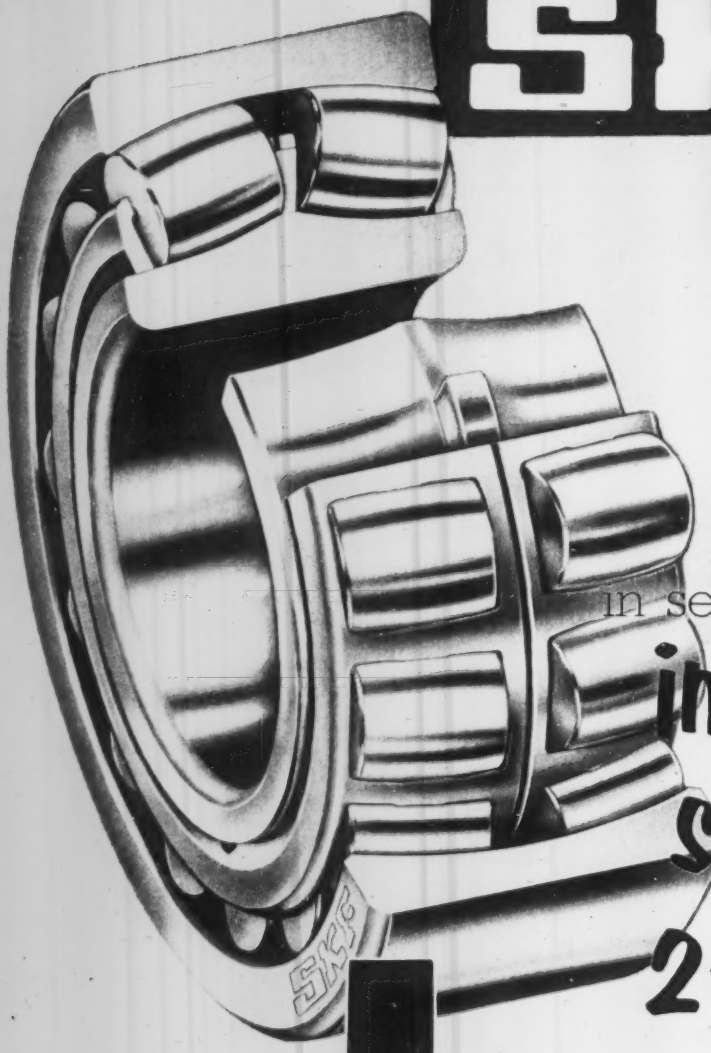
North American Philips Co. Inc., Mt. Vernon, N. Y., appointed Thomas D. Shadduck X-ray Co., Binghamton, N. Y., as its dealer in that territory. Shadduck will sell and service Philips medical and industrial x-ray diagnostic and therapy equipment.

Moves Chicago District Office

American Wheelabrator & Equipment Corp., Mishawaka, Ind., moved its Chicago district office to 2406 W. Lunt Ave. Robert M. Rich continues as district manager, assisted by Lawrence W. Kohlmeyer

(*Please Turn to Page* 124)

SKF Increases



this improvement
in series 222 and 223
increases the
service life
2 to **3½ times**

other advantages are important

ECONOMY: When designing new equipment, the desired life can be obtained by using smaller or lighter bearings at considerable cost saving.

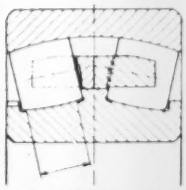
COMBINED LOADS: This great forward step in bearing design provides a Spherical Roller Bearing capable of carrying heavier combinations of radial and thrust loads or pure thrust loads of greater magnitude.

SELF-ALIGNMENT: The important self-aligning feature of SKF Spherical Roller Bearings has been preserved, so that considerable misalignment between the shaft and housing has no ill effect whatever on bearing capacity or life.

© 1953, SKF INDUSTRIES, INC.

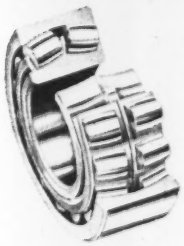
capacity

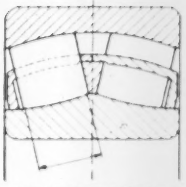
of spherical roller bearings 25% to 50% by means of improved internal design



BEARING 22315

This is the Spherical Roller Bearing design originated by SKF *more than 30 years ago.* The cross-section shows how the integral inner ring flanges, and the undercuts adjacent thereto, limit the effective length of the rollers.





BEARING 22315C

Here is the *latest* SKF improvement, a ***revolutionary advance in design.*** Effective roller guiding is accomplished by means of a separate ring. This eliminates the need for undercuts! This type of guide ring permits the rollers to take the position which their contact with the rings dictates. This assures uniform load distribution over the entire length of the longer rollers at all times. *Result* – greatly increased capacity and life.

SKF, the originator of the Spherical Roller Bearing, has, here again, provided Industry with another *first* through this improved design. During more than 4 years, thousands of installations have been made in railroad journals, vibrating screens, steel mill machinery and numerous other fields. Performance, in all cases, has been outstanding.

SKF Sales Engineers in our District Offices throughout the country will assist you in making use of the important advantages of the improved internal design of SKF Spherical Roller Bearings.

7423 A

This 12-page booklet gives you additional facts—sizes available—added capacity, size by size—increased life you can expect for each size—dimensional tabulations—and load and speed data. Write for your free copy of Bulletin 365-1 now.

SKF INDUSTRIES, INC., Dept. 616, Philadelphia 32, Pa., *manufacturers of* **SKF** *and* HESS-BRIGHT *bearings.*

SKF®

BALL AND ROLLER BEARINGS

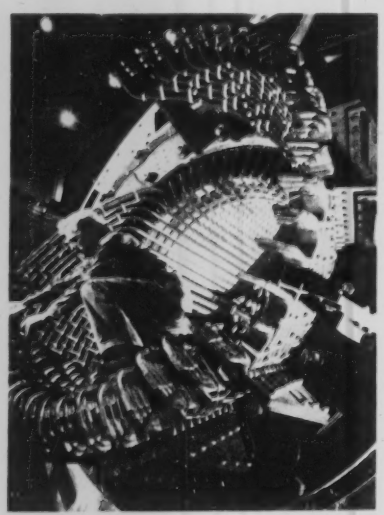
(*Continued from Page* 121)
and Floyd H. Toman as district sales engineers.

Mongerson Enlarges Facilities

Mongerson's Electrical Machine Works Inc., Bakersfield, Calif., is expanding. Expansion of the company, which was incorporated recently, is being directed by Ray Mongerson, founder; W. R. Burlingham, chairman of the board; D. Deleray Mouron, president. The latter two industrialists are owners of Screw Products Corp. of America, Delron Co. Inc., Electromec Inc., and other manufacturing companies in Southern California. The firm makes electrical switches for irrigation and oil field use.

Le Count Tool Works Moves

W. G. Le Count Tool Works, Norwalk, Conn., was incorporated as Le Count Tool Works Inc. and moved to larger quarters at 390 Capitol Ave., Hartford, Conn. Management of the plant has been taken over by John H. Dowd and Michael Lombardi, with W. H. Le Count being retained in a research and advisory capacity. The company makes expanding mandrels, etc.



Power Portrait

A workman is shown applying insulating tape to the coil ends of the stator for a 135,000-kw turbine generator. This machine is being made in the East Pittsburgh plant of Westinghouse Electric Corp. Plant's capacity to produce large generators has been doubled

Interstate Steel Opens Office

Interstate Steel Co., Evanston, Ill., established a branch sales office at 132 E. 30th St., Indianapolis. The office is headed by Lawrence W. Schellhammer, formerly with Inland Steel Co. and Jones & Laughlin Steel Corp.

Drug Store Miners

WHEN Fairway Realty Co. took over a Providence, R. I., building for remodeling, workmen "prospected" it inch-by-inch. For decades the place had been used by a jewelry manufacturer, Ostby & Barton. And year-by-year tiny filings of precious metals had gathered in floor and ceiling cracks.

The Fairway "miners" sucked up a poke of gold and silver dust, worth nearly $40,000 enough to pay a good chunk of the remodeling costs.

Now the building is two-thirds filled with a dozen small firms, reports the New England Council, mostly jewelry-making concerns.

Syro Steel Builds Addition

Syro Steel Co., Girard, O., is building a 10,000 sq ft addition. Charles Syak, president, says it will give the company "more elbow room" in its new plant into which it moved recently.

Elgin Seeks Enterprises

Elgin National Watch Co., Elgin, Ill., plans to diversify into two new fields miniature electronic components and precision production instruments. The company has undertaken an intensive search program to locate concerns in these specific fields "with a view to affiliation," says J. G. Shennan, president.

Elgin has prepared an "enterprises wanted" brochure which tells in detail the objectives of the program, the type of operations Elgin is interested in, and the advantages accruing to concerns affiliating with the 89-year-old firm.

To make basic investigations of prospective affiliates and to separate likely and unlikely prospects from inquiries, the company has set up a "commercial development" department headed by Gordon Odell of the Elgin managerial staff.

Electronics and instrumentation are logical diversification choices because they parallel the Elgin tradition of precision workmanship. Manufacturers' sales in electronics rose from $576 million in 1946 to $4350 million in 1952, while automatic production instruments have enjoyed a 21 per cent annual growth rate since 1946. By contrast, the watch industry has experienced since 1940 a growth rate of 7.16 per cent.

Canada Wire Buys Plant

Canada Wire & Cable Co. Ltd., Toronto, Ont., purchased a new plant in Smith's Falls, Ont., and will transfer equipment to the new unit from its Leaside, Ont., plant, says James Y. Murdoch, president. The program will cost about $750,000.

Basco Mfg. Appoints Agents

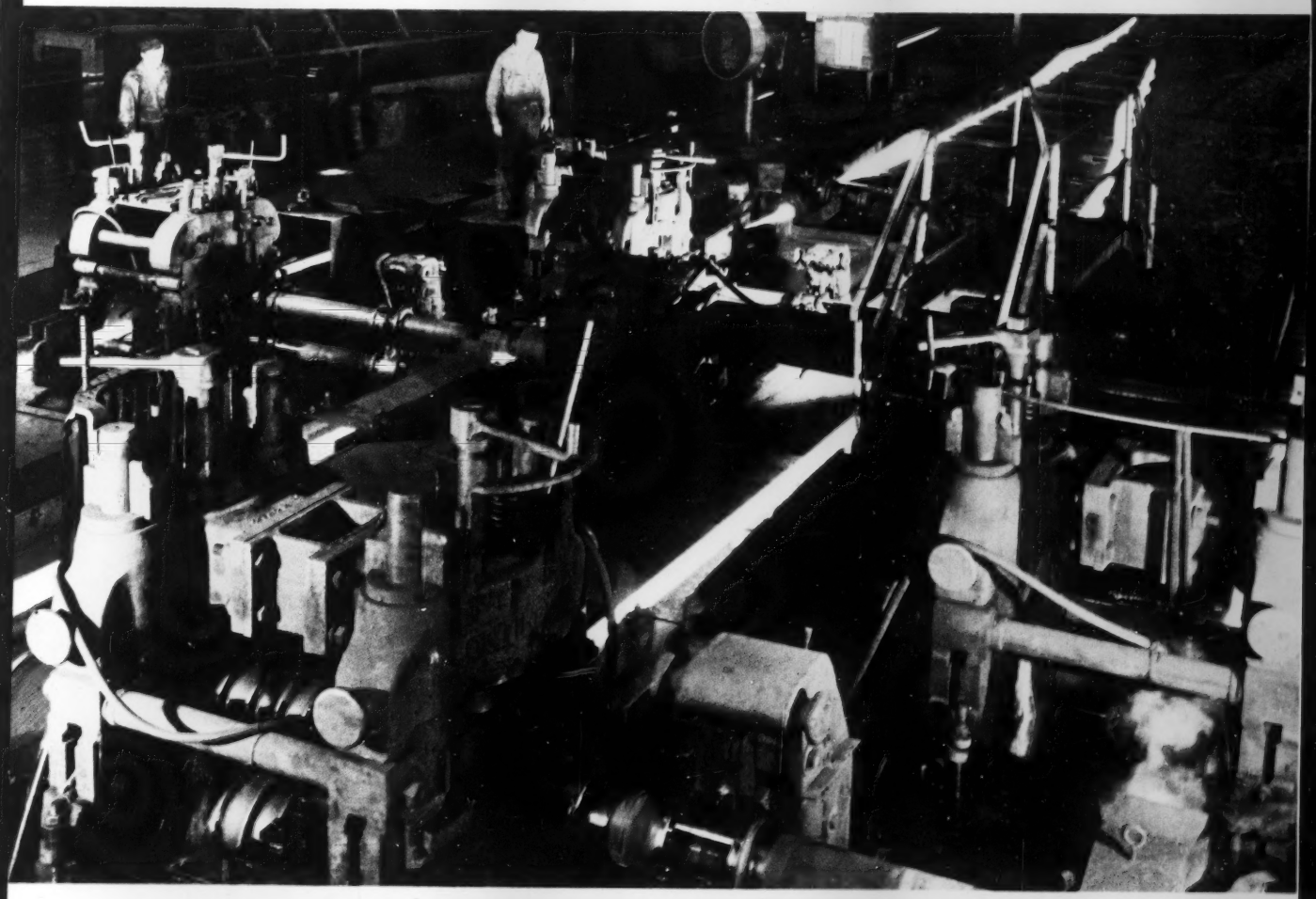
Basco Mfg. Co., Stamford, Conn., appointed as representatives for the sale of its separators: Charles Koslowsky, Kansas City, Mo.; Francis Hughes & Associates Inc., Montreal, Que.; John R. Whitney & Co., Boston; Brown & Stuart Co., Stamford; Robert F. Evans & Sons, Torrance, Calif.; Lyman B. Warren Co., St. Paul; McLohne Co., Rockford, Ill. Basco also appointed as distributors to handle marketing of its line of sheet steel separators: Schlank-Savage Co. Inc., Harrison, N. J.; Clark Hopkins Equipment Co., Philadelphia; A. G. Cardineau & Co., Englewood, N. J.; J. W. Jackson Co., Cleveland.

California Firms Merge

Sierra Engineering Co. merged with R. A. Hawks Co., both of Sierra Madre, Calif. The latter organization will be operated as R. A. Hawks Co. Division of Sierra Engineering Co. Precision job machine work will be carried on by the Hawks Division while research and development work in the mechanical and human engineering fields will be conducted by Sierra. Sierra product lines include miniature mechanical chain and sprockets and the prosthetic components.

CONTINENTAL

CROSS COUNTRY MERCHANT MILL



Complete Rolling Mill Installations

SLABBING MILLS
UNIVERSAL MILLS
PLATE MILLS
HOT STRIP MILLS
COLD STRIP MILLS
TEMPER MILLS

Mills complete with Auxiliary Equipment

★ ★ ★

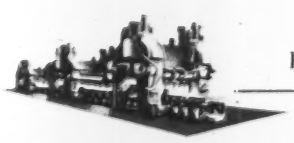
CONTINENTAL CHIPPER
ROLL LATHES
SPECIAL MACHINERY

BLOOMING MILLS
STRUCTURAL MILLS
RAIL MILLS
BILLET MILLS
RGD MILLS
MERCHANT MILLS

CASTINGS carbon and alloy steel from 20 to 250,000 pounds

ROLLS iron, alloy iron and steel rolls for all types of rolling mills

WELDMENTS fabricated steel plate, or cast-weld design.



Plants at
East Chicago, Ind. • Wheeling, W. Va. • Pittsburgh, Pa.

CHICAGO • PITTSBURGH

CONTINENTAL
Foundry & Machine Company

Do you know these facts about vanadium?

Vanadium is available in quantities for every application.

Ferrovanadium is one of the most versatile, economical ferro alloys. It gives new life and endurance to virtually every type of alloy steel and iron. Its applications range from watch springs to giant forgings. *And a little goes a long way,* with small additions often doing the work of large additions of other alloys.

Through a long-range program of planned expansion, Vanadium Corporation has played a leading role in keeping vanadium available. Latest results of this program . . .

VCA mines in the U.S. and overseas offer a reliable, growing source of the finest vanadium ore.

New and enlarged facilities at the VCA plant at Cambridge, Ohio, assure a plentiful supply of highest-quality Vancoram Ferrovanadium for every iron and steel application.*

In the years ahead, Vanadium Corporation will continue to keep ahead of the growing demand for vanadium throughout American industry producing increased quantities of Vancoram Ferrovanadium for both military and civilian use.

**For greater shipping economy and ease of handling, Vancoram Ferrovanadium can be furnished in palletized form.*

Producers of alloys VANCORAM metals and chemicals

VANADIUM CORPORATION OF AMERICA

420 Lexington Avenue, New York 17, N. Y.

DETROIT • CHICAGO • PITTSBURGH • CLEVELAND

Technical Outlook

September. 21, 1953

LIFETIME BATTERIES— First of two thousand new nickel-cadmium batteries from France will be installed shortly in U.S. naval aircraft. Once in place, they will require no attention, and in most cases will last the lifetime of the plane. Offsetting the high initial cost are some definite advantages: Ninety per cent more ampere-hour capacity, hermetically-sealed cells requiring no refilling with water, no hydrogen produced during recharging, and a non-corrosive electrolyte. Another plus: Batteries can be located anywhere without thought of accessibility for later servicing.

MORE LEADED STEEL— Lead-bearing alloy steel appears to be making headway in the machining fields. By adding 0.15 to 0.35 per cent lead to standard AISI 4140, for instance, machining is reported to be 50 per cent faster, cutting is cooler and tool life doubled in some cases. Mechanical properties of the lead-bearing alloy are said to be the same as the standard alloy. At least one warehouser, Ryerson, is carrying a full stock of two qualities, AISI 4140 and 8620.

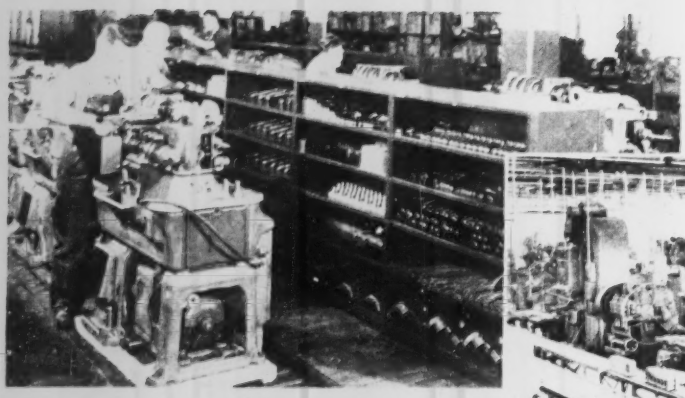
HOT BEARING STEEL— A bearing steel developed for use at elevated temperatures is announced by Bower Roller Bearing Co., Detroit. To minimize the problems of annealing and machining a high carbon steel, they came up with a nickel-chromium-molybdenum carburizing grade that is subsequently case hardened. Steel has performed very well in temperatures up to 500 F, and temperature up to 900 F for 100 hours have developed no permanent change in hardness or dimensions.

OILLESS COOLANT— Recent demonstration of Dypral, a new machine coolant developed by Dynamic Industrial Products, Danbury, Conn., got the nod of approval from spectators. It is a true chemical solution, completely water soluble and free of any oil. Touted as an all-purpose coolant, it is odorless, smokeless, does not foam, and does not turn rancid in use or storage. Examples of its efficiency: 4130 cut at 450 sf with up to 100 per cent increase in tool life in one case; 4140 cut at 165 sf; 52-100 cut at 330 sf. A 10-1 water mixture costs 19 cents per gallon.

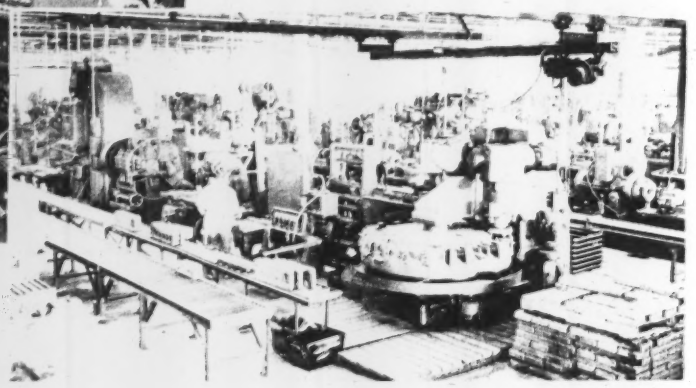
NEW LINE UPS— Aircraft industry is paying increasing attention to precision optical instruments, such as transit and level, theodolite and telescope, as aids in building tools. Instead of using mechanical means, settings for large assembly and mating jigs, for instance, are taken directly from line of sight.

STAINLESS BLANKETS— Stainless steel in thicknesses of 0.002 and 0.004 inches is used for insulation blankets in some jet planes. Between sheets of this near-foil stainless is packed a layer of asbestos or fiberglass. Used as shield between hot sections of the plane and pilot's compartment, it effectively keeps engine heat out of the cockpit.

WHAT'S ON THE INSIDE— You can't get along without electric motors, so don't miss the cover story on NEMA's new standards for frame sizes, 1 to 30 hp. How builders can crowd more horses into the same space and how it's going to affect you is on p. 128 . . . Then there's the one about the plater who found he was doing better with a nickel substitute. His explanation is on p. 174 . . . Even if you didn't start the Carbon Bar selection story last week, this installment and the concluding one next week are well worth your time. It's on p.131 this week . . . There're two ways of protecting a water system from corrosion, and one of the nation's authorities on water treatment develops the subject from there, p. 181.



Machinery builders will be first to benefit from redesign. Motor cavities can be smaller or more horsepower can be squeezed into same space. Big motor users can expect some temporary inconvenience in parts and replacement-motor stocking; they'll gain in long run



UP-RATED MOTORS

Bigger Inside, Smaller Outside

New designs will slim down the nonproductive parts of electric motors consistent with 25 years of refinements in the working parts. Old standards step aside for progress

By THOMAS F. HRUBY
Associate Editor

MORE HORSEPOWER per pound will pay dividends in lower handling and storage costs, more economical mounting platforms and easier installation and maintenance.

In a nutshell, that's how the recently-approved 1 to 30-hp ac motor rerating program of National Electrical Manufacturers Association will affect industry. There's bound to be transition inconveniences for builders and users alike; but, as one motor manufacturer's spokesman put it, ". . . no matter how you look at it, progress is the motivating factor and we can't buck it any longer."

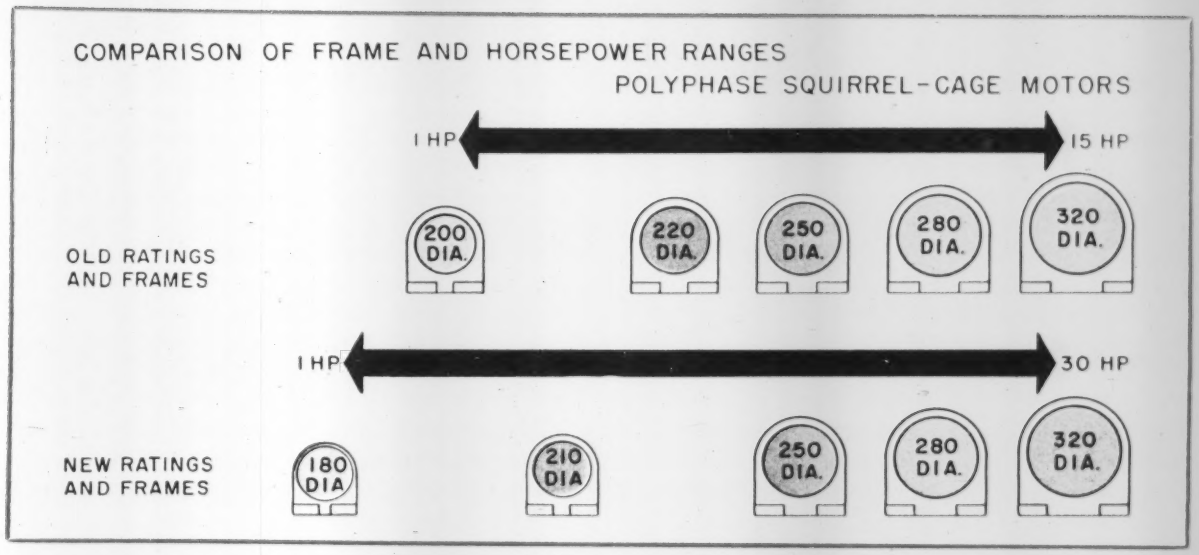
How It Started—More specifically, this is the "why" of the program: Most integral horsepower electric induction motors are today still built to basic frame size-horsepower relationships established nearly 25 years ago, this despite technological advances designed into the working portions of the motor during that period. That existing standards were holding up progress was evident to motor builders for some time. Changing standards on a basic component like motors, however, is not done without carefully weighing all factors.

Electric motors supply power to 85 per cent of this country's production machinery, and much of our industrial success is traceable to the fact that motor standards have meant safe, compact, reliable power no matter whose nameplate was on the motor. Motor manufacturers, gathered last fall at the NEMA meeting in Atlantic City, agreed that tentative new standards should be drawn up, and these were approved in May.

User Advantages — Under the new standards, a 5-hp motor, for instance, will continue to do everything the older 5-hp motor did. Torques, temperature rise and speeds defined under a specific rating are not changed. Drip-proof motors will still be 40° C rise; fan-cooled will still be 55° C rise. Difference will show up in the frame dimensions which will all be smaller.

Probably the original equipment builders — machine tool, pumps, heating and ventilating, etc.—are most interested in smaller, more compact motors for the obvious reasons of appearance, size and weight of their finished products. These benefits are actually passed directly to the user who gets a machine requiring less floor space, reduced installation time and expense.

Fewer Frames—In the frames 180 diameter and larger, motor manufacturers learned over the years that a fewer number of frame diameters and at least two horsepower ratings per frame for any given speed, provide a better utilization of materials and minimum of parts. This new program



utilizes only five diameters in the range of 1 to 30-hp open and 1 to 25-hp enclosed ratings, against six formerly used.

Since 3 and 5-hp ratings fit easily into the 210 diameter, there was no longer any need for retaining the 200 and 220 diameters. Thus the 210 replaces the 200 and 220 diameters. However, since some of the new rerated motors have the same frame designations as the previous standard, the letter "U" has been added to indicate larger shaft extension dimensions. To the user these changes mean fewer mounting problems and a minimum of spare parts stocking.

Some Apprehension—A transition to rerated motors is understandably going to inconvenience the user who operates large numbers of motors. It will mean stocking additional renewal parts and perhaps spare motors. But eventually, because he does operate more electrical horsepower, motor builders believe the big user will realize more of the benefits from standards which trim non-productive weight from his motor power.

Equally important, space trimming will enable the user to solve the ever recurring problem of increasing horsepower on machines because of new load requirements. For instance, a 254U could be mounted in the same space as an old 254-frame size with a corresponding jump in horsepower from 5 to 7½.

Age of Refinements—Stepped-up industrial pace of the last 20 years is reflected in motor design. The new and improved materials of the boom era are responsible for smaller, harder-working motor parts which in turn are responsible for the changed standards.

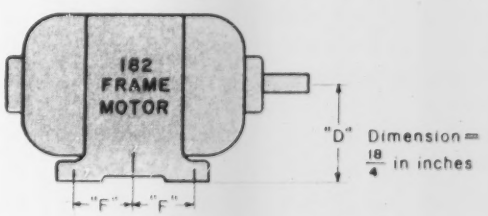
Basically, the design engineer has only four components with which to work in improving his motor design . . . conductor, insulation, magnetic steel and mechanical parts. Copper is still the same basic conductor that was used in early motors; it is the changes in the other three components that have enabled designers to get more out of a motor of the same size.

Insulation Changes—Concept of insulation has probably changed more than anything else. In 1929, standards were based upon use of cotton-covered wire, and paper and cotton slot and phase insulation. Impregnating varnishes were made of natural resins, oils and solvents. In short, good dielectric strength presupposed massive insulation.

Today insulations are "man-made" synthetic materials that have gradually replaced cotton and paper just as synthetic yarns have replaced the natural fibers in the textile industry. Synthetic

FIRST 2 DIGITS OF FRAME NUMBER = 4 x "D" DIMENSION

Example: A shaft height of 4½ inches, multiplied by 4, gives 18 – designating a 180 diameter motor



THIRD DIGIT OF FRAME NUMBER IS OBTAINED FROM "F" DIMENSION

Example: If the "F" dimension is 2½ inches, the preferred chart gives the third digit as "2". In this case, a 182 frame motor is designated.

POLYPHASE MOTORS, DESIGNS A AND B

Horizontal and Vertical, 60 cycles, 550 volts and less, General-purpose, Squirrel-cage

Open-type, 40° C

HP	3600 RPM OLD	3600 RPM NEW	1800 RPM OLD	1800 RPM NEW	1200 RPM OLD	1200 RPM NEW	900 RPM OLD	900 RPM NEW	720 RPM OLD	720 RPM NEW	600 RPM OLD	600 RPM NEW
½	...	...	...	...	...	...	204	182	...	...	...	...
¾	...	...	...	...	203	182	224	184	...	...	...	...
1	...	...	203	182	204	184	225	213	254	213	254	215
1½	203	182	204	184	224	184	254	213	254	215	284	254U
2	204	184	224	184	225	213	254	215	284	254U	324	256U
3	224	184	225	213	254	215	284	254U	324	256U	326	286U
5	225	213	254	215	284	254U	324	256U	326	286U	364	324U
7½	254	215	284	254	324	256U	326	284U	364	324U	365	326U
10	284	254U	324	256	326	284U	264	286U	365	326U	...	...
15	324	256U	326	284	364	324U	265	326U	...	...	...	...
20	326	284U	364	286	365	326U	.					
25	3658	286U	364	324								
30	3658	324S	365	326								
40	3658	326S										

Totally-enclosed, Fan-cooled Type, 55° C

HP	3600 RPM OLD	3600 RPM NEW	1800 RPM OLD	1800 RPM NEW	1200 RPM OLD	1200 RPM NEW	900 RPM OLD	900 RPM NEW	720 RPM OLD	720 RPM NEW	600 RPM OLD	600 RPM NEW
½	...	...	...	...	...	...	204†	182	...	...	...	...
¾	...	...	...	...	203†	182	224†	184	...	...	...	...
1	...	...	203†	182	204†	184	225†	213	254	213	254	215
1½	203†	182	204†	184	224†	184	254†	213	254	215	284	254U
2	204†	184	224†	184	225†	213	254†	215	284	254U	324	256U
3	224	184	225†	213	254†	215	284†	254U	324	256U	326	286U
5	225	213	254	215	284	254U	324	256U	326	286U	365	324U
7½	254	215	284	254U	324	256U	326	284U	365	324U	*	326U
10	284	254U	324	256U	326	284U	364	286U	*	326U		
15	324	256U	326	284U	364	324U	365	326U				
20	326	286U	364	286U	365	326U						
25	3658	326S	365	326U								

†Totally-enclosed, non-ventilated

*No previously assigned standard

resin coatings on wire are thinner and better than old double-cotton covering. Synthetic material in slots, between phases and in connections and leads, is better and more compact. Synthetic varnishes more thoroughly impregnate, bind and protect windings.

A lesser mass of insulation now does a better job of protection; it not only saves space but it is impervious to most of the traditional insulation enemies . . . oils, chemicals and solvents.

Temperature Considerations — Even though the new materials can withstand much more temperature, they will still be working under present temperature ratings, considered liberal for even cotton and paper. Translated into performance, this should mean even longer insulation life under rerating.

Heat transfer is another big consideration. Lesser mass of more dense insulation permits more copper to be put into stator slot with equal or better insulation. This in turn means better use of magnetic circuit. Another plus for the dense insulation is the elimination of trapped air space which slows heat transfer away from the windings and to the surface. Better lamination materials have reduced the heat that must be dissipated, so there is really a three-fold gain in heat transfer.

Metalworking Contributions — Thanks to improvements in metals and metalworking art, the last two design factors have been developed to a high level, too. The sheet metal of 1938 has been improved many times and lamination steel has outgrown the specialty mills until today it is a major product of most steel producers. Amounts of copper and steel required to get given field strengths for specified ratings have been improved continuously.

Die casting under high pressures used today, along with some insulating tricks, produce rotors far superior to the 1938 units. Shell molding has come into the picture to give perfection in form and appearance. Nodular iron, with its desirable casting and working characteristics, is now a common commodity. Heat treatment of lamination steels adds to the effective use of a given amount by perfecting its interlaminar resistance. Added together, these advances are as much responsible for the smaller motor as any other item.

Production Timetable — Best NEMA estimates on availability of the various frame sizes are as follows:

Frame Numbers	Date
182 and 184	Jan. 1, 1954
213 and 215	June 1, 1954
254U and 256U	Nov. 1, 1954
284U and 286U	April 1, 1955
324U and 326U	Sept. 1, 1955

These are all open 4-pole polyphase induction motors under the new standards. Most motor manufacturers will continue to build both old and new frame sizes during a transition period which could vary for different manufacturers.

While NEMA members are not bound to follow the new standards it is generally believed that the vast majority will favor rerating and, after a time, be producing none of the older frame sizes.

Paint Stops Fire Spread

Easily applied to all interior walls and ceiling areas by brush or spray, this fire retardant paint stops fire from spreading.

Because every drop of this paint is claimed to contain a mass of minute "built-in" fire extinguishers when exposed to flame Fyr-Kote pours out Carbon Dioxide and Calcium Chloride which smothers fire and retards the spread of flame on the surface.

Fyr-Kote is manufactured by Morris Paint & Varnish Company, St. Louis.

Selection of Carbon Steel Bars

Amount of oxygen in steel prior to or during casting will determine whether it is killed or nonkilled. Types are semi-killed, rimmed, killed, capped

By G. P. WITTEMAN
Assistant Metallurgical Engineer
Bethlehem Steel Co.
Bethlehem, Pa.

PART II

FUNDAMENTALLY, liquid steel is like charged water. In both there is an evolution of gas in the form of bubbles.

Primary reaction in liquid steel is the combination of carbon and oxygen to form a gas. If oxygen available for this reaction is not removed prior to or during casting (as by the addition of silicon or some other deoxider such as aluminum), gaseous products continue to evolve during solidification.

Proper control of the amount of gas evolution during solidification determines type of steel. If no gas is evolved, the steel is termed killed because it lies quietly in the mold. Increasing degrees of gas evolution result in semi-killed, capped or rimmed steel.

Rimmed — These steels may be identified by marked differences in chemical composition or contrast which prevails across the section and from top to bottom of the ingot, as shown by a macroetched specimen. The ductile outer rim, which etches light, is lower in carbon phosphorus and sulphur than the average chemical composition of the whole ingot. The inner portion or core, which etches darker, is higher than the average of the three elements.

This is illustrated by Fig. 1, which shows the cross section of a C1010 rimmed carbon steel ingot (22 inch x 25½ inch x 62 inch). Longitudinal sulphur print characterizes the rim—lighter portion—and the core—darker portion. Further identification of rim and core is apparent in drawing. Check concerns analyses of carbon, manganese and sulphur at the various lo-

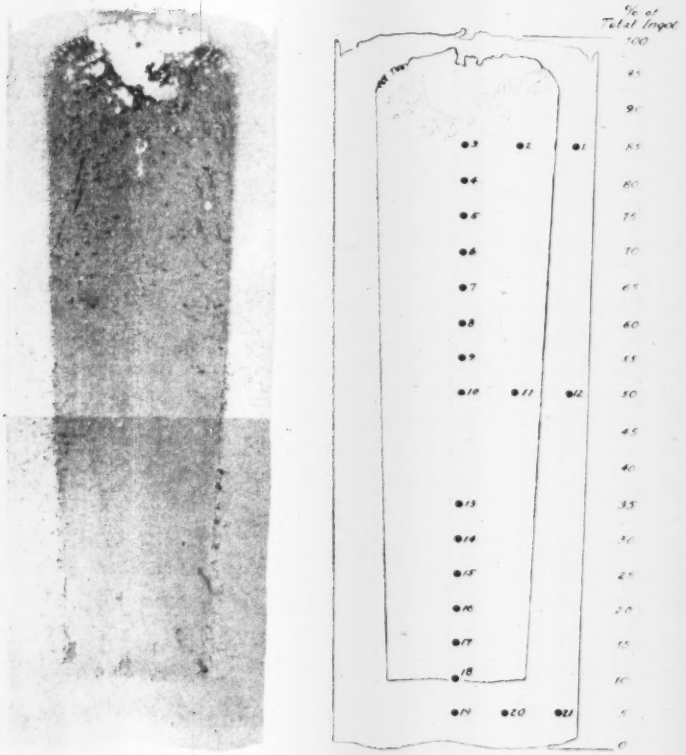


Fig. 1—Longitudinal sulphur print on left shows rim—lighter portion—and the core—darker portion—of a C1010 rimmed steel ingot

CHECK ANALYSIS OF CARBON, MANGANESE AND SULPHUR AT VARIOUS LOCATIONS IN INGOT USED FOR ROLLING INTO BAR PRODUCTS

Ladle analysis: Carbon 0.10; Manganese 0.41; Phosphorus 0.020; Sulphur 0.030.

Check No.	Analysis C	Mn	S	Location in Ingot: Cross Section	Length	Characterization
1	.06	.35	.020	Rim	Top	Low carbon & low sulphur
2	.11	.41	.054	Midway	Top	Sulphur segregation
3	.10	.39	.060	Center	Top	Sulphur segregation
10	.08	.38	.041	Center	50%	Intermediate sulphur segregation
11	.08	.39	.044	Midway	50%	Intermediate sulphur segregation
12	.07	.34	.020	Rim	50%	Low carbon & low sulphur
19	.06	.39	.020	Center	Bottom	Negative carbon & sulphur segregation
20	.06	.38	.021	Midway	Bottom	Negative carbon & sulphur segregation
21	.06	.37	.021	Rim	Bottom	Low carbon & low sulphur

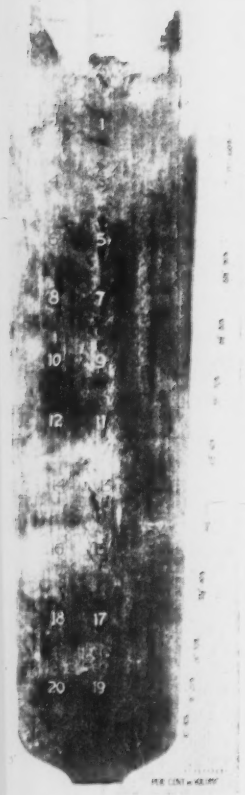
cations in the ingot. These are summarized in accompanying table.

Limits — For carbon steels to effectively rim, chemical composition is restricted to carbon 0.25 per cent maximum and manganese 0.60 per cent maximum. Except for closing and welding of gas voids, the structural pattern of the ingot persists through the rolling process to the final product, and is readily revealed after hot acid etching.

Rimmed steel bar products, because of chemical composition, surface and other characteristics are used advantageously in the manufacture of finished products involving cold bending, cold forming or cold heading. Because of variables inherent in rimmed steels, they are not generally recommended for forging, hot upsetting, piercing, carburizing and heat treating applications.

Killed Steels—As killed carbon steels are usually deoxidized with silicon and/or aluminum, there is practically no evolution of gas during solidification. This contributes to a relatively high degree of uniformity of chemical composition and metallurgical properties. However, ingots, depending upon conditions, do indicate some variations in chemical composition from surface to center of cross section and from top to bottom.

Variations are illustrated in Fig. 2, showing a longitudinal sulphur print of a 22 inch x 25½ inch x 75 inch hot top ingot, Grade C1070. Ladle analysis is carbon 0.72, manganese 0.90, phosphorus 0.027, sulphur 0.040, silicon 0.30. The figure identifies check analyses locations—odd numbers center and even numbers midway. Accompanying table lists check analyses at the respective locations. Check No. 1, top center, carbon 0.79 per cent, indicates positive carbon segregation. Check No. 19, bottom center, carbon 0.69 per cent, indicates negative carbon segregation.



ANALYSIS

		C	Mn	P	S	Si
LADLE		72	90	027	040	30
CHECK	1	79	92	029	043	31
	2	73	90	028	040	31
	3	73	89	026	042	30
	4	74	90	027	043	33
	5	73	91	027	046	32
	6	75	90	027	041	32
	7	74	91	027	041	33
	8	73	90	027	042	33
	9	73	90	028	040	32
	10	74	90	028	041	32
	11	76	92	027	043	32
	12	73	89	027	040	31
	13	73	90	028	040	32
	14	74	90	028	041	32
	15	72	89	026	039	32
	16	72	91	026	038	32
	17	71	89	026	040	31
	18	73	90	027	040	31
	19	69	89	027	039	30
	20	72	90	026	040	31

Fig. 2 This test shows variations in chemistry and properties of killed steel at various locations on ingot. User can specify grain size he desires

Shrinkage—Owing to the nature of solidification of killed carbon steels, there results a primary shrinkage cavity or pipe which is eliminated by discarding the affected part of the ingot during the blooming operation. Also, killed steels may have secondary pipe in addition to the primary pipe. It is best controlled by casting in big end-up ingot molds.

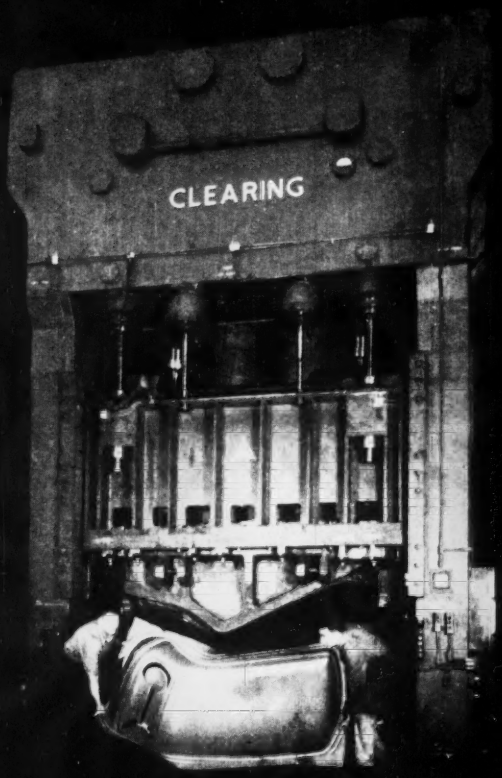
In big-end-up molds, the greater mass of metal at the top retards the solidification rate, as compared with the balance of the ingot. This factor, in combination with a hot top, generally confines primary and secondary pipe within the region of the hot top. Otherwise, depending upon conditions, carbon steels may be cast in big-end-up ingot molds without hot tops or in big-end-down ingots molds with or without hot tops.

Killed carbon steels for bar products are known for their uniformity of chemical composition and metallurgical properties. They are recommended for forging, hot upsetting, piercing, cold shaping, carburizing and heat treating applications.

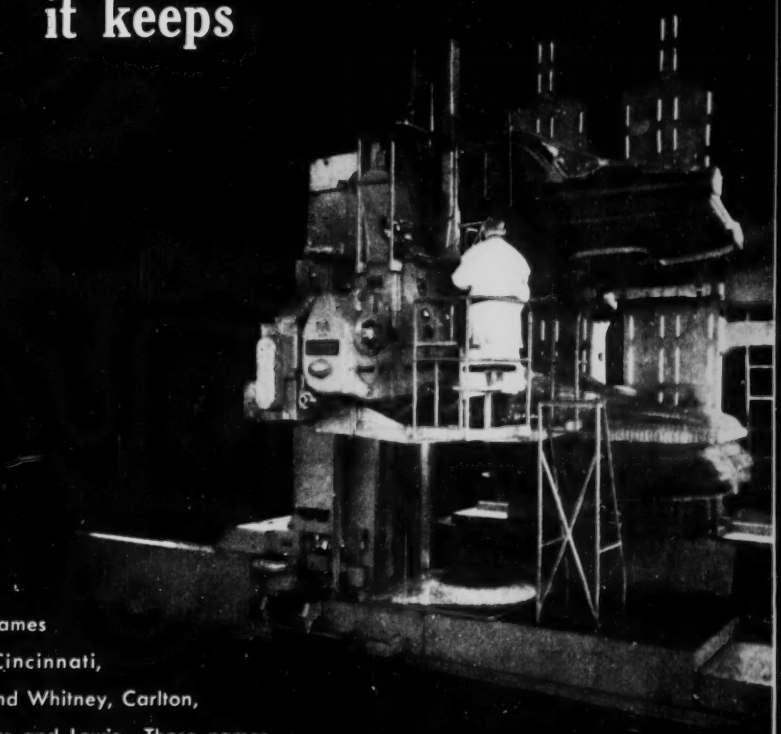
Semi-killed—Semi-killed carbon steels are customarily deoxidized with lesser amounts of silicon and/or aluminum than are killed steels. Accordingly, semi-killed carbon

This is the second of three installments.

Previous installment covered the many considerations involved in the selection of bar products, including availability, combination grades, standard steels, and effect of constituents. Third and last installment next week will summarize engineering data with respect to given end uses.



a company is known by the machinery it keeps



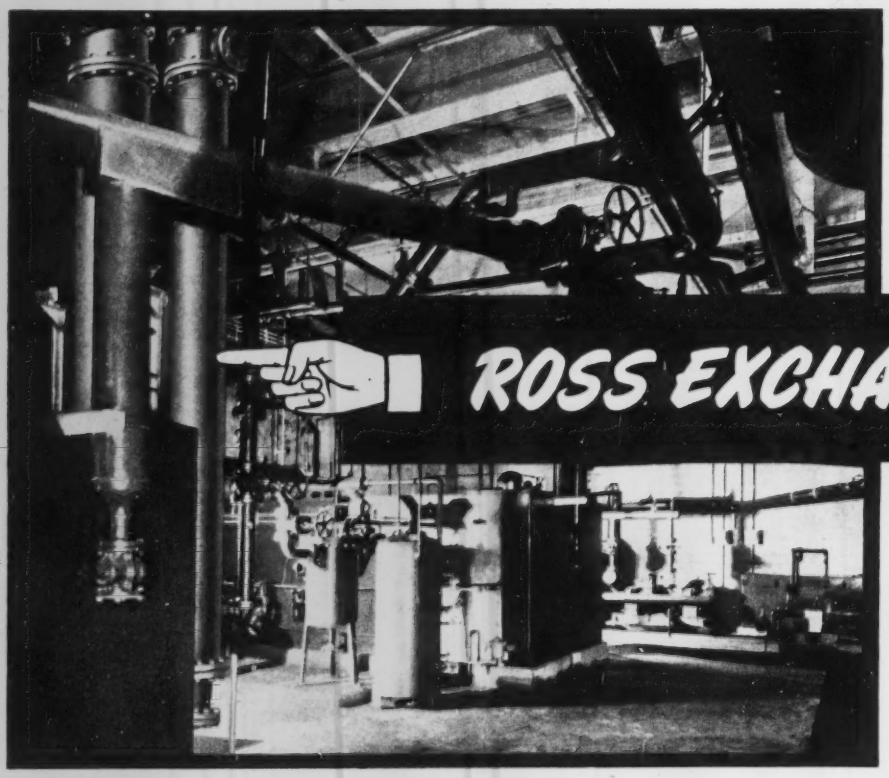
Jarecki quality is built on men and machines. The men are expert craftsmen whose names will never be news, but the names on Jarecki machinery are known around the world. Each is the finest product in its field. We acknowledge our indebtedness to names such as Clearing, Bliss, Danly, Cincinnati, Kearney and Trecker, Pratt and Whitney, Carlton, Mattison, and Giddings and Lewis. These names and the machines behind them have helped to make the name Jarecki a symbol of dependability.

JARECKI

engineering tools dies stampings assemblies plating painting

GRAND RAPIDS, MICHIGAN

JARECKI MACHINE AND TOOL CO.
JARECKI PRODUCTS INC.
JARECKI ENGINEERING CO.



Safeguarding lubrication temperatures for United Rolling Mills

To produce strip with precision accuracy, at high speeds and pressures, United Rolling Mills require close temperature control. Back-up roll bearings need a generous supply of properly cooled lube oil — *and get it!* In this mill oil cellar, as in others designed and built by United Engineering and Foundry Company, Ross Type CP Exchangers have been installed as original equipment. Temperature-safe lubrication is thus assured!

Unmatched for rugged dependability and high thermal efficiency, Ross Exchangers are on duty in practically every segment of the metal-working industry: on engines, centrifugal pumps, compressors, hydraulic presses, die casting machines, speed increasers . . . and as quenching and cutting oil coolers.

Pre-engineering and full standardization make Ross Type CP Exchangers promptly available to meet most requirements. For more information, request Bulletin 2.1K1.

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Fig. 3—Here is a longitudinal sulphur print of a semi-killed ingot. Pipe cavity is shown in top region

steels have variations in uniformity. Their chemical composition and metallurgical properties are intermediate between those of rimmed and killed carbon steels.

During solidification of semi-killed carbon steels, there is evolved an amount of gas from within the body of the ingot. Depending upon degree of oxidation, this tends to compensate, entirely or in part, for the shrinkage that accompanies solidification.

Since pipe cavities are generally minimized, semi-killed carbon steels are normally cast in big-end-down molds without hot tops—sometimes referred to as open top. This is illustrated in Fig. 3, showing a longitudinal sulphur print of a semi-killed ingot, 22 x 25½ x 70 inches, with a pipe cavity in the top region.

Capped Steels—Term is derived from the method used in casting the ingot, which results in characteristics similar to rimmed steels, but the gradation is between rimmed and semi-killed steels.

During casting of the steel, a deoxidizer is sometimes added to effect a controlled rimming action. There may be a tendency for the steel to rise in the mold. This is due to the gas entrapped during solidification, which is in excess of that needed to counteract normal shrinkage. Time of gas evolution is limited by the capping operation, which retards the formation of an excessive number of gas voids within the ingot.

Capped steels are cast by two methods: 1. Bottle top molds using a heavy metal cap. 2. Big-end-down, open top molds. Here chemical cap is of aluminum or ferrosilicon.

By either method the capping operation is done just after the ingot mold is filled. Heavy metal cap is placed on the surface of the molten steel or sufficient quantities of aluminum or ferrosilicon are stirred on the surface of the molten steel. This causes the molten steel on the surface to be quiescent, thus promoting rapid solidification of the top. Consequently, capped steels do not segregate as much in the upper central portion of the ingot as do rimmed steels.

Capped steel bar products have surface quality equivalent to that of rimmed steel, and they are more uniform in chemical composition and other characteristics. In general, they may be used to better advantage when the material is subjected to cold bending and cold forming. Capped steels are not recommended for forging, piercing or heat treating applications.

Grain Size — Metallurgically, there are two distinct types of grain size, sometimes termed inherent grain size and apparent grain size. Inherent grain size, commonly known as the austenitic grain size, coarse or fine, may be controlled by the steelmaking practice.

Grades up to 0.28 carbon, which are designated as non-killed, cannot be specified to a controlled grain size, although they are generally coarse grain. Majority of the killed carbon grades for bar products may be specified coarse or fine grain dependent upon the kind and amount of deoxidizer used in the steelmaking.

Coarse grain steels are usually deoxidized with fixed amounts of silicon. Fine grain steels are controlled by fixed amounts of aluminum or titanium, with or without the addition of silicon.

Grain Size Test—Common practice is to determine inherent or austenitic grain by the McQuaid-Ehn test or the oxidation method. Both are standardized in ASTM specification E-19. This test, by carburizing at 1700° F for 8 hours, determines grain size as classified by charts as coarse grain Nos. 1 to 5 and fine grain Nos. 6 to 8.

Basically, the test defines how the steel responds when carburized and correlates the deoxidation practice used in steelmaking. Thus, the steel can be classified for specific end uses, involving such things as forging, cold shaping, heat treatment and machining.

Fracture Test—Apparent grain size represents the true condition of the steel resulting from the following operations: As-rolled, as-forged, normalized, annealed, carburized, quenched and tempered or stress relieved.

Where possible, apparent grain size is revealed by a fracture test. Sometimes the P-F test (penetration-fracture) is used for grading of fractures. Variations are from No. 1 to No. 10 or No. 1 coarse, No. 5 intermediate and No. 10 fine.

Heat Treatment—Having been heated to an austenitizing temperature, coarse-grain steel will cool without appreciable transformation to the martensite-forming temperature. Fine-grained steel, with many grain nuclei, has a greater tendency, while passing through the knee of the S-curve, to transform to pearlite prior to reaching the martensite-forming temperature.

If carbon steels are to be properly applied to specific end uses, methods of fabrication, heat treatment, etc., the inherent grain size must be duly appraised. Assuming that the chemical composition, type and physical condition of the steel are the same, the inherent grain size exhibits some important characteristics.

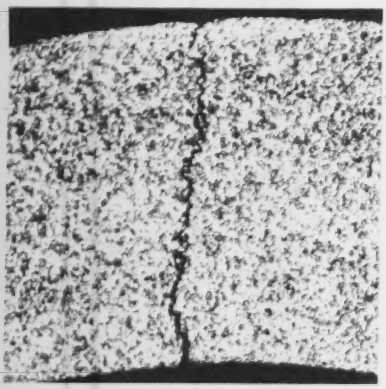
(Advertisement)

BRIDGEPORT BRASS COMPANY

COPPER ALLOY BULLETIN

Bridgeport Brass Co. MILLS IN BRIDGEPORT, CONN. AND INDIANAPOLIS, IND. IN CANADA: NORANDA COPPER AND BRASS LIMITED, MONTREAL

Heat crack resulting from deep drilling. Mag. 7x.



Transverse cross section etch NH_4OH. Mag. 60x.

Heat Cracks Can Be Prevented

Overheating During Machining of Brass Rod Harmful

High heat, developed from severe machining and drilling operations on leaded brass rod, but not satisfactorily carried away by the coolant-lubricant, may cause serious hot breaks or cracks on screw machined pieces. Such cracks are intercrystalline in nature and are usually distinguished by darkening or heat tinting on the edges of the cracks.

Causes of Overheating

It is considered good practice to maintain the coolant-lubricant at a temperature of 90° F or lower. If it rises above this value, its cause should be investigated. Cutting oil has been known to heat up to 112° F or higher after $1\frac{1}{2}$ hours of continuous operation. Hot oil is obviously not a good cooling medium and indicates trouble. Overheating can result from the following:

1. Dull, improperly designed tools and broken drills.
2. Insufficient lubrication at the cutting zone.
3. Excessive machining feeds and speeds.

It is well known that dull tools require greater pressures and develop higher friction heat.

Deep drilling is particularly heat forming because it is difficult to cool the drill directly. This is aggravated when operating with a broken drill which generates still greater friction.

Deep cuts and wide forming tools which remove considerable stock also create a large amount of heat. Sufficient side rake should be allowed to prevent burnishing the side of the metal being cut, another source of excessive heat.

Tool hardness is very important. The highest possible hardness without brittleness should be attained in order to prevent premature tool wear.

Keep Cool

Heat developed at the cutting zone should be dissipated rapidly by the coolant-lubricant. Insufficient cooling may be due to the fact that the stream of cooling liquid may be partially deflected by the chips curling above the tool, thereby preventing sufficient contact between coolant and cutting edges.

Faster cooling has been accomplished by spraying the coolant-lubricant from below to strike the underside of the cutting zone. The greater surface area of the coolant-lubricant spray particles is said to carry off the heat faster than the usual flooding from above. It also minimizes the tendency towards welding or the accumulation of deposits on the cutting edge of the tool.

When excessive heat is developed and cannot be removed quickly enough, it may be necessary to increase the cooling rate of the cutting fluid by increasing its volume.

Keeping both tool and work cool is the answer to rapid machining of hard, tough alloys like Duronze III (silicon aluminum bronze), which require more power and develop more heat than leaded brass rod.

Excessive Machine Speeds

Increasing machine speeds without corresponding modifications of the cooling procedure and coolant-lubricant composition may lead to overheating and possible cracking of machined pieces.

Ordinary cutting oils are capable of cooling work up to a certain machining speed. Beyond this point, the oil heats up. Increased cooling properties can sometimes be obtained by adding a percentage of kerosene or mineral seal oil. Changing to a good grade of water soluble fluid with better cooling properties than oil is sometimes helpful.

When high speed operation is the goal and the volume of work warrants it, the installation of a refrigerated central cooling system should be considered. Adequate cooling of tools and work means greater tool life and higher productivity.

Bridgeport's Technical Service

Modern engineering specifications call for a variety of alloys with special physical properties such as high tensile and yield strengths, great hardness, good corrosion resistance. Such materials may be difficult to machine unless special procedures are followed. Much information on the variety of screw machine alloys available and machining methods can be found in Bridgeport's "Technical Handbook."

Please consult our nearest district sales office in connection with your metal problems and requirements. For immediate deliveries, Bridgeport carries adequate stocks in its warehouses which serve the most active industrial centers. (128)

CAUSES OF CORROSION

This article is one of a series of discussions by C. L. Bulow, corrosion metallurgist of the Bridgeport Brass Company.

COPPER-ZINC ALLOYS versus SODIUM CHLORIDE SOLUTIONS

Corrosiveness of Hot Sodium Chloride Solution at 176° F

Corrosion tests similar to those described in last month's issue of this column were conducted in hot 2 N sodium chloride solution to determine the effect of temperature on the corrosion rates. The results of these tests are given in the table below.

Here again the straight copper-zinc alloys containing from 60% to 80% copper are more subject to high localized corrosion at the water line due to dezincification, substantiating the preference for the copper alloys containing 85% or more copper for use in sodium chloride solutions.

The data clearly show that the use of high-zinc alloys should be avoided in hot sodium chloride solutions since the rates of corrosion are relatively high, approaching that of low carbon steel.

The alloying of the high-zinc brasses with tin or lead, while having some corrosion inhibiting value does not improve the corrosion resistance significantly towards hot sodium chloride solutions.

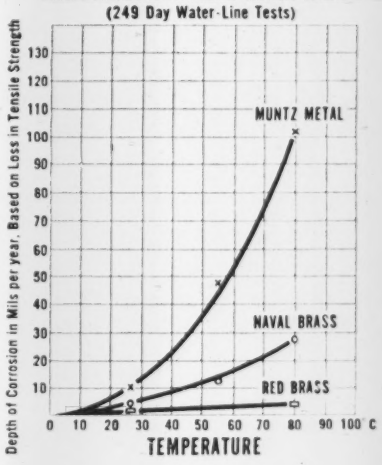
High Temperature Accelerates and Low Temperature Decelerates Corrosion

The effect of temperature can be seen by a comparison with the data presented here with those given in last month's issue of this column. The high-zinc alloys show a marked increase in the rate of dezincification at the water line (based on loss in tensile strength). For example, the 61% Cu, 39% Zn, ¾% Sn; and the 60% Cu, 40% Zn brasses increased 6 and 11 times respectively when the temperature was increased from 80° F to 176° F, while the 85% Cu, 15% Zn alloy (Red Brass) showed only a twofold increase over the same temperature range.

It should be noted also that the Naval Brass, which contains 0.7% tin, had a rate of dezincification about one-third that of Muntz metal.

At lower temperatures the rate of dezincification is low and explains the long life obtained from Naval Brass and Muntz metal piping, tubing, plates, sheets, etc., used in contact with cooling brines. However, where the maximum resistance to dezincification is needed, copper, Red Brass, high-copper alloys and inhibited brasses should be used.

EFFECT OF TEMPERATURE ON CORROSION OF SEVERAL BRASSES in 2N Sodium Chloride Solutions (249 Day Water-Line Tests)



NEW DEVELOPMENTS

This column lists items manufactured or developed by many different sources. None of these items has been tested or is endorsed by the Bridgeport Brass Company. We will gladly refer readers to the manufacturer or other sources for further information.

Foot Hydraulic Lift Truck designed to carry skids raises load platform by pressure on foot pedal. Light pressure on return lever is said to return load to floor level without dropping. Unit is said to be easy to maneuver in narrow aisles. Overall length, 49 in., width 14 or 18 in., platform height 7-in. in lowered position with lift through 1¾-in. Weighs 100 lbs. and has load rating to ½-ton. **No. 1326**

Coated Plug and Ring Gages are reported to have longer life, and to be corrosion resistant. Manufacturer coats gages to a thickness of 0.000025-in. Coating is said to be harder than hardened tool steel. **No. 1327**

Waterproof Pressure Sensitive Tape is reported to be useful for waterproof sealing of cartons and equipment. It is said to conform to government specification JAN-P-127, Type I, Grade B, for industrial and defense use. **No. 1328**

Drive Stud Fastener is said to be useful in fastening light members (name plates, covers, brackets, etc.) to heavier parts. Light blows are said to drive stud home and secure parts. Grooves in the stud shank displace metal to form raised flute. When driven into holes of same nominal diameter as shank, flutes are compressed against wall, anchoring stud. Available in many sizes in round, flat and countersunk head styles. **No. 1329**

WATER LINE CORROSION OF COPPER-ZINC ALLOYS IN HOT 2 N SODIUM CHLORIDE SOLUTION AT 176° F ± 9° F (249 DAY TEST)

Copper-Zinc Alloys	Depth of Corrosion Based on Loss in Tensile Strength	Depth of Corrosion Based on Loss in Weight
100% Cu	0064 ipy	00491 ipy
90% Cu, 10% Zn	0059	00250
85% Cu, 15% Zn	0064	00240
80% Cu, 20% Zn	0292	00493
70% Cu, 30% Zn	0520	0071
65% Cu, 35% Zn	0251	00636
60% Cu, 40% Zn	1131	01085
Modified Copper-Zinc Alloys		
61% Cu, 39% Zn, ¾% Sn	0268 ipy	00570 ipy
61% Cu, 39% Zn, ¾% Sn, 0.07% As	0676	00586
61% Cu, 39.9% Zn, 3.1% Pb	0564	00684
59% Cu, 38.6% Zn, 2.09% Pb, 0.3% Sn	0383	00553
Other metals		
Low Carbon Steel (0.19% C, 0.8% Mn)	0890 ipy	0427 ipy
Aluminum Alloy (4.1% Cu, 0.7% Fe)	2760	0610

BRASS, BRONZE, COPPER, DURONZE, NICKEL SILVER, CUPRO NICKEL
BRIDGEPORT BRASS
BRIDGEPORT BRASS COMPANY, BRIDGEPORT 2, CONN. • ESTABLISHED 1865
Mills at Bridgeport, Connecticut, and Indianapolis, Indiana • In Canada: Noranda Copper and Brass Limited, Montreal
Warehouse Service with Slitting Facilities in Principal Cities (Advertisement)

Furnace No. and Age in Weeks	No. of Cooling Units	Water Flow, gal/hr	Average Temperature Rise, °F.	Heat Losses Therms/hr.*	Heat Losses % of Total Heat Loss	% of Total Heat Input
No. 1 (6)	Doors (5)	2,802	45.6	12.78	25.1	3.0
	Door frames (5)	10,584	25.0	26.51	52.0	6.2
	Gas port coolers (10)	3,378	34.3	11.59	22.9	2.8
	Total	16,764	30.4	50.88	100.0	12.0
No. 2 (7)	Doors (5)	8,988	21.9	19.72	18.1	5.0
	Door frames (5)	9,312	60.4	56.26	51.4	14.2
	Oil burner and tunnel coolers (4)	8,892	36.6	32.56	29.9	8.2
	Back-wall coolers (2)	1,068	6.5	0.69	0.6	0.2
	Total	28,260	38.7	109.23	100.0	27.6
No. 3 (16)	Doors (5)	14,622	11.9	17.42	25.8	4.7
	Door frames (5)	23,892	18.6	44.40	65.9	12.1
	Oil burner and tunnel coolers (4)	8,196	6.1	5.04	7.5	1.4
	Back-wall coolers (2)	2,760	1.8	0.50	0.8	0.1
	Total	49,470	13.6	67.36	100.0	18.3

*A therm is a unit of heat equal to 100,000 Btu's

How To Curb Heat Losses From Cooling Units

Large heat losses occurring in open-hearth furnace chills and door frames which are subjected to direct radiation or gas impingement can be curtailed by adequate protection with refractories

By A. M. FRANKAU
Plant Engineering Division
British Iron & Steel Research Association
London

WATER-COOLING losses are still a major item in the heat balance of an open-hearth furnace, and finality has not yet been reached in efforts to reduce these to a minimum. Water-cooling as such is not necessarily detrimental to the furnace.

When certain vital parts of the brickwork are protected in this way, more heat can be concentrated in the bath area, which may give greater production for a lower heat consumption per ton of product. It is more important to reduce direct heat losses to the cooling water than to reduce water-cooling.

Main Problem — Although the loss of heat to cooling water is the main problem, the supply and pumping of the water involved is also important. For example, on several of the furnaces on which measurements were taken, more than 36 tons of water were circulated for every ton of steel produced.

In the range of temperatures normally used, the quantity of water flowing does not affect the heat losses, but it can have a considerable effect on the supply, pumping, and circulating costs.

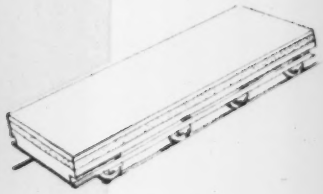
Water-Coolers—Water-cooling is applied to open-hearth furnaces to protect refractories, to cool sliding surfaces, and to cool structural supports.

Cooling pipes fitted in gas ports are a good example of the direct use of water-cooling to protect refractories. These pipes may be placed on the end of the nose of the port and covered by a thin layer of chrome paste. In practice, although they soon become partly exposed owing to the refractory falling away, they prevent serious erosion of the port and subsequent lack of control of the flame.

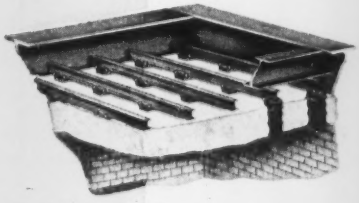
In arranging cooling units on a furnace, a balance is struck between the cost of heat being carried away continually in the cooling water and the cost of having the furnace out of production for repairs. Cooling units may therefore be used to insure that major parts of the furnace have about the same life.

A summary of the water-cooling losses from three stationary fur-

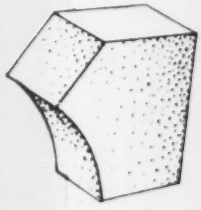
These performance records show why **B&W KAOCAST** *is a unique refractory concrete*



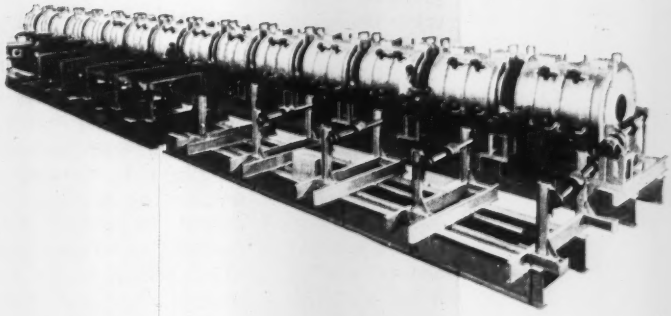
In a tunnel kiln car top, ordinary fireclay brick crumbled after a few trips . . . B&W Kaocast is still going after 400 trips without deterioration.
Another car top required maintenance after each cycle. After 8 months, B&W Kaocast was still in service . . . and required no maintenance whatsoever.



Used for soaking pit covers, B&W Kaocast reduced installation time over 30%.



Special shapes of B&W Kaocast can be cast overnight to meet production demands. Kaocast is so versatile that many maintenance engineers keep a supply on hand for miscellaneous jobs.



In a GRADIATION* normalizing furnace, B&W Kaocast cut installation costs 25-28%, including the cost of reusable forms.

*TRADE MARK

For use at temperatures up to 3000 degrees, this refractory concrete can be molded, cast directly in place or applied with a cement gun. That's the "capsule story" of B&W Kaocast . . . the versatile refractory that furnace operators are putting to work in hundreds of applications to (1) cut installation costs, (2) lengthen furnace life. • *Ask your B&W field representative for specific data.*

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Eight Open Hearths Bolster British Capacity

View of this open hearth shop shows a part of the facilities at Hawarden Bridge steelworks of John Summers & Sons Ltd., near Chester in northwest England where about 500,000 tons of capacity was added to British production. Operation of the eight 150-ton open hearths is under instrument control. Now in full operation, each furnace is rated at 2000 tons per week operating on hot metal

naces is presented in the accompanying table.

First Trial—Furnace in the first trial was of the venturi type, and was fired with a mixture of blast-furnace and coke-oven gas. The second furnace was also of the venturi type, but was fired with steam-atomized oil fuel. Its door frames were of the "archless" type, *i.e.*, they had an additional cooled projecting ledge at the lintel to provide arch support. This almost certainly accounts for the increased heat losses from these units compared with the previous furnace. Largest contribution to the considerable heat losses from this furnace was from the tunnel coolers.

The third furnace tested was similar to the second, but was fired with a 50/50 mixture of tar and pitch creosote. In this case, even for an older furnace, the heat losses were much smaller. This might be due to a possible difference in furnace pressure, which would cause flame and hot gases to lick around the unprotected door frames and tunnel coolers of the second furnace.

Biggest heat losses seem to be caused by the door frames. The differences between these losses from the three trials are probably due mainly to the variations in design and the corresponding surface areas that are subject to direct radiation from the furnace. The fuel used in firing the furnaces may also have some effect.

Lack of Protection—Results of these trials clearly indicate that the heat lost by cooling water is an important factor in furnace operation, and the major cause of heat losses was found to be lack of adequate refractory protection of the cooling units. Losses as high as 27½ per cent of the heat input were recorded, which represents an additional heat input of over 40 per cent necessitated by the cooling units.

Quantities of water used are necessarily large because of scaling and deposition problems, and this makes the temperature rise through the units small. Design of cooling units to take advantage of larger temperature rises with reduced water flow would effect a saving in pumping and supply costs.

Losses Tallied—For stationary furnaces, about 50 per cent of the total heat losses are accounted for by the door frames, the maximum value recorded for a single unit being 14·5 therms/hr. at a flow-rate of 1866 gal/hr and a temperature rise of 76.9° F.

An inch of refractory protection over a water-cooled surface can reduce the losses per hour from 196,000 to 23,000 Btu/sq ft. This provides evidence of the large losses that occur through exposed cooling units and of the importance of insuring refractory protection at all times.

The required heat input for a given heat loss from the furnace chamber is shown to be in the ratio of 1.8:1 for oil firing. This means that any measured heat losses can be increased by at least one-half to give the heat input required.

Necessary Evil—It should not be thought, however, that water-cooling is an unnecessary evil in an open-hearth furnace. Water-cooling can and does play an important part in increasing the life of vulnerable parts of the furnace, and possibly allows harder driving. But these losses cannot be ignored, and every effort should be made to reduce them wherever the possibility presents itself.

Many units, such as chills and the inside surfaces of door frames are never protected in any way, and it is suggested that the use of high-magnesia ramming mixes on a welded stud foundation would help to give some protection.

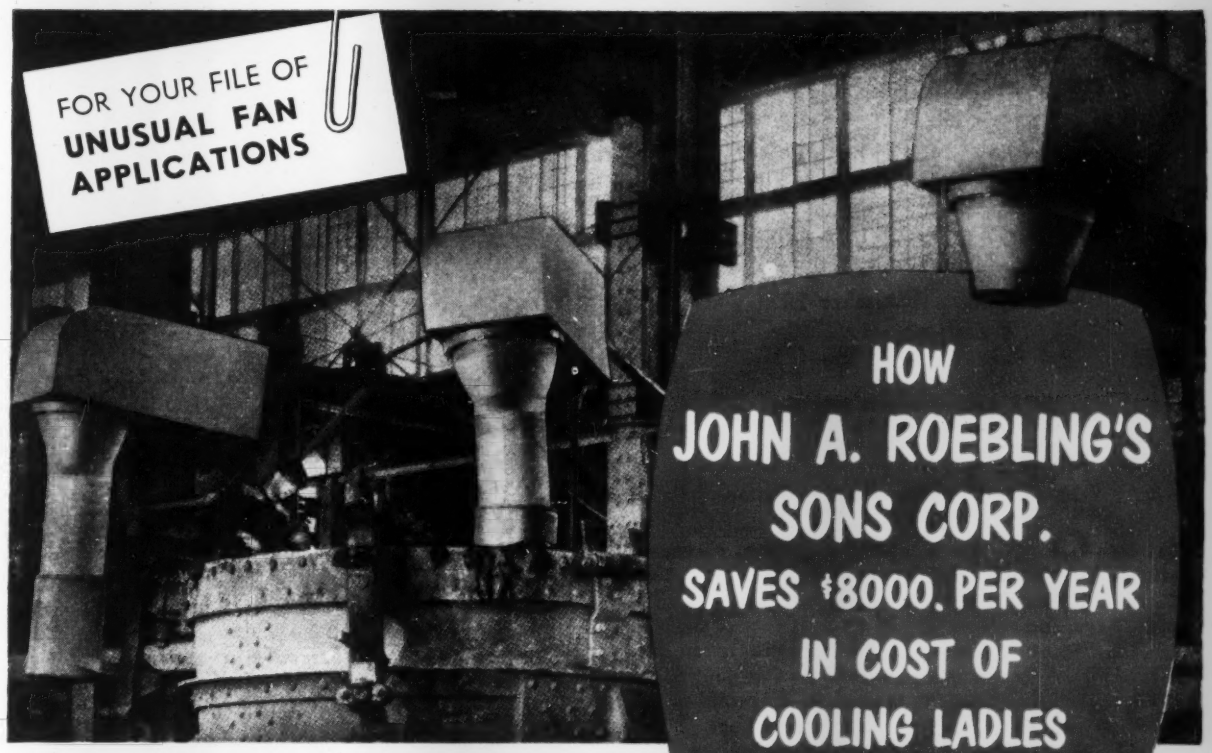
Asbestos Packings

Industrial rod packings of braided asbestos, using an impregnation of 35 per cent Teflon (tetrafluoroethylene resin) are now being marketed by United States Rubber Co.

This type of packing, according to Elmer L. Spence, manager of mechanical packing sales, is expected to provide longer service than rod packings previously available because of its higher resistance to acids and alkalies.

The principal advantages of the resin for industrial packings is its high resistance to chemicals, including virtually all petroleum and coal tar solvents. It will perform satisfactorily in temperatures ranging from −90° F to 500° F.

Two types of abestos with tetrafluoroethylene will be supplied by U. S. Rubber. The white asbestos impregnated with the resin is designed for dilute acids, caustics and various chemicals on centrifugal or reciprocating pumps and valve stems.



FOR YOUR FILE OF
UNUSUAL FAN APPLICATIONS

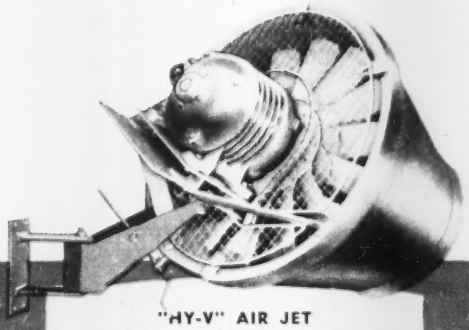
HOW JOHN A. ROEBLING'S SONS CORP. SAVES $8000. PER YEAR IN COST OF COOLING LADLES

At the Roebling, New Jersey, mill of John A. Roebling's Sons Corporation, seventeen 45-ton ladles are kept busy in the production of carbon steel, from which the famous Roebling wire rope is made. After each heat, ladles must be cooled down from 2000° F and pouring nozzles installed.

Dissatisfied with the old method of using compressed air for cooling ladles, engineers at Roebling's conceived the idea of trying a DeBothezat "Hy-V" Air Jet to do the job. They selected a "Hy-V" Air Jet with 21" fan wheel and 1½ HP motor which produces 5600 CFM at a nozzle velocity of 4570 FPM, and it worked so well that Roebling has installed four more. Each is mounted on a swinging bracket and is equipped with special nozzle extension so that air is discharged near the bottom of the ladle. Nozzle extension is retractable.

Here's what E. M. Yard, Roebling Combustion Engineer, has to say about the installation: *"Nearly the full capacity of one 200 HP air compressor was previously used to do this job. The use of "Hy-V" Air Jets means a power saving of probably $8,000.00 per year. In addition, the installation of these fan units, at a total cost of about $4,000.00 eliminated the need for additional air compressor capacity which would have cost $16,000.00. These fan units will recover their cost in about six months from power savings alone."*

Whether it's a question of cooling people or equipment, "Hy-V" Air Jets do the job efficiently and inexpensively. For detailed information, ask your DeBothezat representative or write our factory, Dept. S953, for catalog DH-8-51.



"HY-V" AIR JET
is a 14-blade axial-flow pressure fan which projects a high velocity stream of air as far as 65 feet. Built with fan wheels 18" through 30" in diameter, with nozzle velocities up to 5780 FPM.

Conical Roller Bearings

DeBothezat Fans

Division of American Machine and Metals, Inc.
EAST MOLINE, ILLINOIS

Association of Iron & Steel Engineers

Technical Program—1953 Convention

WILLIAM PENN HOTEL—PITTSBURGH **SEPTEMBER 28, 29, 30—OCTOBER 1**

MONDAY, September 28

9 a.m.—Registration
Fort Duquesne Room

9:15 a.m.—Business Meeting
Urban Room

Conducted by President John L. Young

9:30 a.m.—Operating Practice Session
Monongahela Room

Chairmen: George Greene, assistant general manager, Bethlehem Steel Co., Johnstown, Pa., P. E. Thomas, assistant general superintendent, United States Steel Corp., Gary, Ind.

The Impact of Technological Developments in the Light Flat Rolled Steel Process on Consuming Industries, by William T. Hogan, S. J., professor of economics, Fordham University, New York.

Scrap Preparation and Scrap Contamination, by Robert F. Kuhnlein, superintendent of construction, Sheffield Steel Corp., Kansas City, Mo.

Modern Underground Coal Mining, by R. H. Knapp, chief engineer coal, United States Steel Corp., Pittsburgh.

9:30 a.m.—Electrical Session
Urban Room

Chairmen: K. L. Johannsen, division superintendent, maintenance and utilities, United States Steel Corp., Morrisville, Pa., Robert S. Bogar, assistant to general manager, Bethlehem Steel Co., Bethlehem, Pa.

Grounded versus Ungrounded Low-voltage A-C Systems, by H. B. Thacker, distribution engineer, industry engineering dept., Westinghouse Electric Corp., Pittsburgh, Pa.

Cathodic Protection of Mill Grounding Systems, by J. F. Headlee, electrical design engineer, Construction Engineering Bureau, United States Steel Corp., Fairless Hills, Pa.

Integrated Electrical Equipment for Blast Furnaces, by C. P. Hamilton, application engineer, General Electric Co., Schenectady, N. Y.

2 p.m.—Mechanical Session
Monongahela Room

Chairmen: F. E. Robinson, assistant division engineer, American Steel & Wire Division, United States Steel Corp., Cleveland; E. C. Hite, assistant superintendent, maintenance, Timken Roller Bearing Co., Canton.

Foundation Design for Iron and Steel Plants, by G. S. Richardson, consulting engineer, Pittsburgh.

Water Supply for Steel Plants, by Ross Nebolsine, president, Hydrotechnic Corp., New York.

Ultrasonics in Maintenance Planning and Product Quality Control, by R. L. Rectenwald, president, Maintenance Engineering Corp., Pittsburgh.

2 p.m.—Open Hearth Session
Urban Room

Chairmen: G. H. Krapf, assistant chairman—Fuel and Power Committee, United States Steel Corp., Pittsburgh, E. H. Cauger, chief combustion engineer, Wheeling Steel Corp., Steubenville.

Improved Cleaning Techniques for Open hearth Checkers, by J. J. Enochs, sales engineer, Dowell, Inc., Wilmington, Del., and Reece Kincaid, sales engineer, Dowell, Inc., Chicago Heights, Ill.

Cleaning of Open Hearth Checkers and Sewers During Operation, by Robert M. Jordan, assistant superintendent No. 3 open hearth, Bethlehem Steel Co., Lackawanna, N. Y.

Republic's New Open Hearth Furnaces at Cleveland, by E. C. McDonald, superintendent, Combustion Dept., Republic Steel Corp., Cleveland.

New Open Hearth Furnaces at Stelco, by E. T. W. Bailey, chief combustion engineer, Steel Co. of Canada Ltd., Hamilton, Ontario.

9:30 p.m.—President's Reception and Informal Dance
Urban Room

AISE members and guests

TUESDAY, September 29

9 a.m.—Blast Furnace Refractories Session
Urban Room

Chairmen: C. G. Hogberg, assistant chairman—Blast Furnace Committee, United States Steel Corp., Pittsburgh. J. A. Bell, chief engineer, Bethlehem Steel Co., Bethlehem, Pa.

Temperature Distribution in the Hearths of Blast Furnaces; by Professor V. Paschkis, technical director, and Taghi Mirsepassi, research engineer, Heat and Mass Flow Analyzer Laboratory, Columbia University, New York.

Trends in Blast Furnace Linings, by Hobart M. Kraner, ceramic engineer, Bethlehem Steel Co., Bethlehem, Pa.

Bricklaying as a Factor in the Performance of Blast Furnace Linings, by W. S. Debenham, research associate, research and development, United States Steel Corp., Pittsburgh, Pa.

9 a.m.—Lubrication Session
Monongahela Room

Chairmen: C. A. Bailey, lubrication engineer, National Tube Div., Andrew E. Cichelli, lubrication engineer, Bethlehem Steel Co., Bethlehem, Pa.

Activated Alumina for the Maintenance of Gas Engine Crankcase Oils, by Lowrie B. Sargent, Jr., assistant chief, and E. M. Kipp, chief, lubricants division, Aluminum Research Laboratories, Aluminum Co. of America, New Kensington, Pa.

JESSOP high quality shows best when there's tough hot work to do!

Of all the many types and shapes of steel that make Jessop America's most diversified specialty steel house, none shows its quality in the clinches better than the DICA-B brand hot work steel illustrated here in the form of a die. Jessop is justly proud of this steel because its high quality is easy to measure. For example, if you make dies, knives, punches or tools for any type of die-casting, forming, punching, cutting or extruding of hot ferrous or nonferrous metals, Jessop has a steel for you. Jessop has a carefully controlled analysis to give you extra toughness to resist shock, or extra hardness to withstand abrasion, or extra ability to resist temperature change without checking or cracking—or any combination of these virtues. And beyond matchless quality, the fast, efficient service of the Jessop team will please you no end. To find this out very quickly, send us an order for any of the specialty steels listed here.

- STAINLESS STEELS
- HIGH SPEED STEELS
- NON-MAGNETIC STEELS
- HIGH SPEED TOOL BITS
- HEAT RESISTING STEELS
- STAINLESS-CLAD PLATES
- CARBON AND ALLOY STEELS
- TOOL STEELS FOR SPECIAL PURPOSES
- CAST-TO-SHAPE TOOL STEELS
- HIGH SPEED AND ALLOY SAW STEELS
- TEMPERED AND GROUND STRIP STEEL
- COMPOSITE HIGH SPEED STEELS
- STAINLESS AND HEAT RESISTING CASTINGS
- COMPOSITE DIE STEEL SECTIONS
- PRECISION GROUND FLAT STOCK
- DIE STEELS— HOT AND COLD WORK

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ONE OF A SERIES OF ADVERTISEMENTS ON THE HISTORY OF ELECTROPLATING

marvin udy's cadmium . . .
changed *your* way of life!

The modern Udylite Laboratory at Detroit, Michigan

A set of rusty piano wires is responsible for the fast, economical modern Cadmium Process you use today.

In 1919, young Marvin Udy became intrigued by a problem that had never been solved—how to rustproof piano wire without changing the tone. He knew that lead, copper and nickel had been tried without success.

After many experiments, Udy tried a little-known waste metal called Cadmium which he had recovered from flues of a western smelting company. After many failures, he finally succeeded in coating piano wire with the then unknown metal!

His new Cadmium Process worked . . . and an industry was born.

The infant Udylite Company, starting in a stockholder's basement, improved methods and techniques in applying the Cadmium. Through the years, the Udylite Corporation has continued to pioneer Cadmium. It developed the Ball Anode, Ball Anode Containers, the Brighteners . . . and has led every step of the way to the better rust prevention offered today in the newest Udylite Bry-Cad Process.

Udylite has shared these technical improvements with you and the entire industry . . . just as it has shared every improvement in Plating Equipment and Processes through the years.

This Udylite Cadmium Process is just *one* of *many* ways Udylite has pioneered in the electroplating field.

PIONEER OF A BETTER WAY IN PLATING...

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

Oilless Bearings—Their Place in Industry, by Charles D. Spadone, vice president, Spadone-Alfa Corp., New York, N. Y.

Application of Bronze Bearing Alloys, by James L. Duchene, sales representative, National Bearing Division, American Brake Shoe Co., Pittsburgh.

Laminated Fabric Bearing Materials, by Richard L. Berry, manager, A-B-K Sales, American Brakeblok Division, American Brake Shoe Co., Detroit, Mich.

2 p.m. Materials Handling Session
Monongahela Room

Chairman: Carleton Lord, materials handling engineer, United States Steel Corp., Pittsburgh, Pa.

Imported Ore Handling—Machines and Practices, by Erle M. Hayes, sales engineer, Crane & Bridge Dept., Engineering Works Division, Dravo Corp., Pittsburgh, Pa.

Intraplant Handling of Round Billets and Pipe with Special Automotive Equipment, by J. D. Tyson, superintendent, warehousing and shipping dept., National Tube Division, United States Steel Corp., Lorain, O.

Application of Self-Centering Rolls for Strip Processing Lines, by E. T. Lorig, chief development engineer, United States Steel Corp., Pittsburgh, Pa.

2 p.m.—Electrical Session
Urban Room

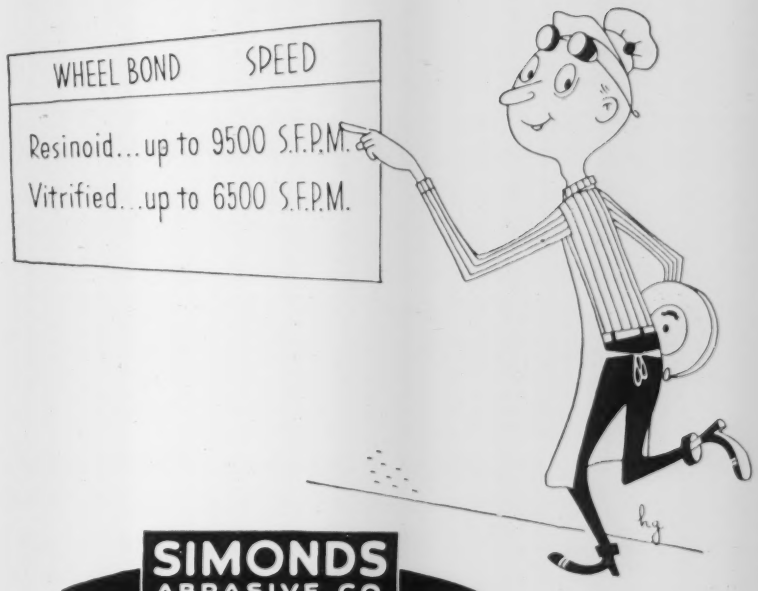
Chairmen: D. C. McCrady, superintendent electrical dept., Steel Co. of Canada, Ltd., Hamilton, Ontario., R. T. Lucas, electrical superintendent, Weirton Steel Co., Weirton, W. Va.

System Engineering for Continuous Strip Processing Line, by J. S. Apperson, steel mill engineering, Industrial Engineering Section, General Electric Co., Schenectady, N. Y.

Temper Mill Control, by George P. Dirth, electrical engineer Granite City Steel Co., Granite City, Ill.

Estimating Motor Room Installation Costs, by Wray Dudley, chief consulting engineer, Pat-

"S.F.P.M." means something else too!



SIMONDS ABRASIVE CO.
Grinding Wheels

As you know, the letters "s.f.p.m." stand for surface feet per minute. For you, "S.F.P.M." can also mean "Simonds for production maximum" with Simonds Resinoid and Vitrified bonded grinding wheels. And this is proven productivity . . . consistently shown in field surveys of industrial plants where Simonds wheels are used. Put these proven producers to work on your high speed and low speed grinding jobs. They're part of Simonds' complete line including grinding wheels, mounted wheels and points, segments and abrasive grain . . . all accurately specified to meet your job needs exactly.

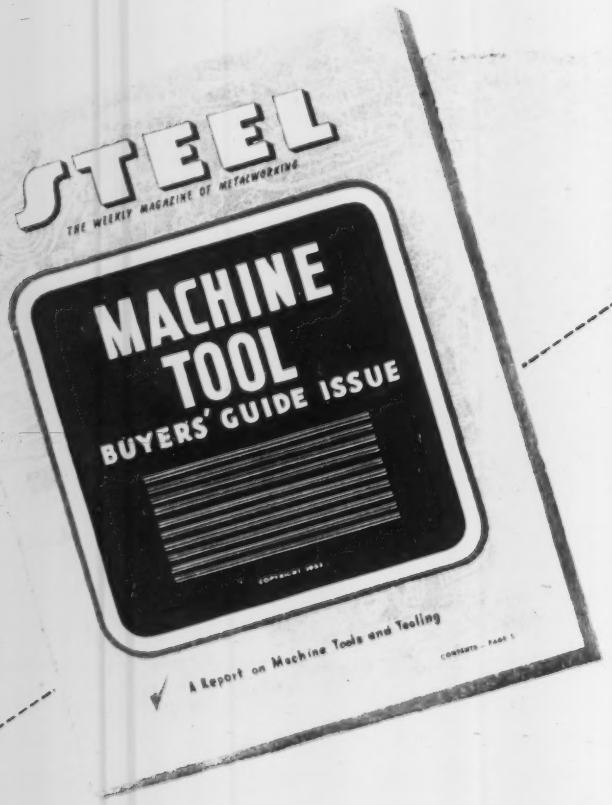
Write for data book and name of your Simonds Distributor.

SIMONDS ABRASIVE CO., PHILADELPHIA 37, PA. BRANCH WAREHOUSES: CHICAGO, DETROIT, BOSTON

DISTRIBUTORS IN PRINCIPAL CITIES

Division of Simonds Saw and Steel Co., Fitchburg, Mass. Other Simonds Companies: Simonds Steel Mills, Lockport, N.Y. Simonds Canada Saw Co., Ltd., Montreal, Que. and Simonds Canada Abrasive Co., Ltd., Arvida, Que.

Coming November, 1953



The editors of STEEL announce this new editorial service for metalworking men in plants doing production machining.

Approximately 500 machine tool manufacturers and 2,000 machine tool users have combined their know-how with that of STEEL's editors to bring you right-now information on:

. . . what to look for when you are modernizing your plant to meet the competitive challenges of more and better product at lower unit cost.

. . . what constitutes a workable equipment replacement program: How many companies are employing programs of this type? How can the MAPI formula be used most effectively?

. . . what machining techniques are gaining in usage? New production processes? Tooling? Machine Tool design features?

. . . what to look for in evaluating your new machine tool requirements. *Who* makes *what* machine? Where can specific machines be purchased?

Here is a publication you can put right to work. It's designed to help you do your job easier and better . . . and in much less time.

To help you plan for more efficient production...

13 Major Machine Tool Classifications will be included in the BUYERS' GUIDE

Boring and Drilling Machines
Broaching Machines
Gear Cutting and Finishing Machines
Grinding Machines
Honing and Lapping Machines
Polishing and Buffing Machines
Lathes
Milling Machines
Planers
Shapers and Slotters
Cutting, Sawing and Filing Machines
Tapping and Threading Machines

Other Machine Tools

More than 20,000 individual machine tool entries (by type, size and manufacturer) will appear in this section.

8 SPECIAL TREND REPORTS based on data received from 2,000 machine tool users will help solve your production problems . . .

1. **Production Methods**
. . . will report trends in relative position of machining to stamping, cold extruding, forging, powder metal forming, production welding, shell molding, die casting, etc.

2. **Machining Methods**
. . . will give a graphic picture of the trends and growth in use of turning, milling, grinding, boring and drilling, etc.

3. **Tooling**
. . . will focus attention on trends toward superspeed turning, milling and broaching, use of carbide tooling, high speed tooling, negative rake machining, contour machining, automatic gauging.

4. **Machine Tools**
. . . will report trend toward use of special machines, standard machine with special tooling, more automation or work transfer and handling devices.

5. **Machine Tool Features**
. . . will report preferences of users for such design features as types of bases, mounting ways, controls, feeds, drives, tracer control motors, checks, chip handling systems, lube systems, etc.

6. **Machining Capacity**
. . . anticipated capacity expansion in 1954 and by 1960 will be measured and reported in relation to 1953 capacity.

7. **Equipment Replacement**
. . . will report on equipment replacement formulas and how to use them, successful replacement programs now in use, who is in charge, what amortization period is most satisfactory, trends in machine tool rentals.

8. **Machine Tool Purchases**
. . . will report on the kind of machines now in use by metalworking plants doing production machining, those they expect to buy, who decides on purchases, how many machines are currently owned.

If you are not now a subscriber, please enter your subscription at once so that you will be certain to get a personal copy of this valuable guide.

STEEL subscribers will receive a copy of the Machine Tool Buyers' Guide in November, 1953 without extra cost.

terson-Emerson-Comstock, Inc., Pittsburgh, Pa.

Crane Power Limit Switches, by Robert W. Graham, superintendent, electrical dept., Bethlehem Steel Co., Lackawanna, N. Y.

6 p.m.—Old Timers Dinner
Urban Room

WEDNESDAY, September 30

9 a.m.—Electric Furnace Session
Urban Room

Chairmen: A. K. Blough, superintendent No. 2 and 3 melt shops, Republic Steel Corp., Canton, O., Robert Sergeson, chief metallurgical engineer, Rotary Electric Steel Co., Detroit, Mich.

Growth Possibilities of Electric Furnace Carbon Steel, by W. C. Wheeler, management consultant, New York, N. Y.

Cost Comparisons of the Open Hearth and Electric Furnace, by David D. Moore, assistant supervisor, Engineering Economics Division, Battelle Memorial Institute, Columbus, O.

The Future of Large Electric Furnaces Compared to Modern Open Hearths, by Frank W. Brooke, Pittsburgh, Pa.

9 a.m.—Rolling Mill Session
Monongahela Room

Chairmen: Alex Montgomery Jr., assistant to vice president—rolling, United States Steel Corp., Pittsburgh, Pa.

The Direct Rolling of Carbon Steel Ingots to Plates on Three High and Four High Plate Mills, by Robert C. McMichael, supervisor 112-120-in. mills, Lukens Steel Co.

Recent Advancement in Continuous Butt Weld and Induction Weld Pipe Mills, by William Rodder, vice president engineering, Aetna-Standard Engineering Co., Pittsburgh, Pa.

Temperature Gradients and Stresses in Iron Work Rolls, by Charles F. Peck Jr., assistant professor, civil engineering, Carnegie Institute of Technology, Pittsburgh, Pa.

2 p.m.—Combustion Session
Monongahela Room

Chairmen: G. J. Gockstetter, district combustion engineer, Republic Steel Corp., Chicago, Ill., A. F. Kritscher, assistant chief engineer, Process Development, National Tube Division, United States Steel Corp., Pittsburgh, Pa.

Progress in the Development and Application of Metallic Recuperators in the Steel Industry, by E. A. Vierow, superintendent, fuel and power dept., Youngstown, O.

New Soaking Pit Facilities at Ford Motor Co. Steel Division, by B. D. Barns, supervisor, and H. E. Raaflaub, senior fuel & utilities engineer, fuel & utilities dept., Steel Division, Ford Motor Co., Dearborn, Mich.

Heat Processing in Industry—Facts and Figures, by Frederic O. Hess, president, Selas Corp. of America, Philadelphia, Pa.

2 p.m.—Electrical Session
Urban Room

Chairmen: F. H. Wickline, electrical engineer, National Tube Division, United States Steel Corp., Pittsburgh, Pa. George A. Kaufman, chief electrical engineer, Jones & Laughlin Steel Corp., Pittsburgh, Pa.

Modern Arc Furnace Equipment and Practices, by E. H. Browning, steel mill engineer, metal working section, Westinghouse Electric Corp., Pittsburgh, Pa.

The Determination of Optimum Current in an Arc Furnace, by W. E. Schwabe, research engineer, National Carbon Research Laboratories, Cleveland, O.

Problems in Supplying Power to Electric Furnaces, by George E. Duerr, industrial sales manager, West Penn Power Co., Pittsburgh, Pa.

7 p.m.—Formal Dinner
Ball Room

10 p.m.—Dance
Urban Room

AISE members and guests. No admission charge.

THURSDAY, October 1

9 a.m.—Combustion Session
Urban Room

Chairmen: F. B. Bevelheimer, power and fuel engineer, Ford Motor Co., Dearborn, Mich., R. A. Lambert, superintendent, steam and combustion, Jones & Laughlin Steel Corp., Pittsburgh, Pa.

Studies on Provision and Use of Oxygen in Steel Plants, by Glen O. Carter, partner, Percival R. Moses & Associates, consulting engineers, New York, N. Y.

Use of Plastic, Castable and Gunning Materials in Soaking Pits, by W. D. Rees, superintendent, bar and blooming mill, Sharon Steel Corp., Lowellville, O.

Combination Fuel Firing for High Pressure Boilers, by C. J. Webster, fuel engineer, National Tube Division, United States Steel Corp., McKeesport, Pa.

9 a.m.—Lubrication Session
Monongahela Room

Chairmen: D. E. Whitehead, general lubrication engineer, Crucible Steel Co. of America, Pittsburgh, Pa., W. M. Schuck, Lubrication Engineer, Armco Steel Corp., Middletown, O.

Factors Affecting Performance of High Temperature Greases, by Eldon L. Armstrong, research associate, Socony-Vacuum Laboratories, technical service dept., Brooklyn, N. Y.

Pumpability of Steel Mill Grease, by Joseph S. Aarons, lubricants chemist, National Tube Div., United States Steel Corp., Pittsburgh, Pa. Richard G. Warren, lubrication engineer, United States Steel Corp., Homestead, Pa., and J. J. Seaton, laboratory technician, National Tube Division, United States Steel Corp., Pittsburgh, Pa.

Steel Mill Lubrication Problems, by A. C. Keiser Jr., supervising lubrication engineer, Birmingham, and E. E. Perso, supervising lubrication engineer, Texas Co., Los Angeles, Calif.; W. H. Mandy, engineering representative, Texas Co., New York; and M. S. Clark, chemist, technical and research division, Texas Co., New York.

1:30 p.m.—Inspection Trip
Pittsburgh Works, Jones & Laughlin Steel Corp.

This trip will include the open hearth shop and blooming mill, as well as the strip mill.

TEST AIRCRAFT CABLE ASSEMBLIES FASTER

Pressure regulators and pressure switches are mounted under the writing table. This protects them from dust or accidental disturbance and provides more working space on the table.

Up to five aircraft cables can be prestressed and proof-loaded at various loads and at one time on this new Riehle Aircraft Cable Tester.

By a turn of a handwheel, loads can be adjusted to any desired point within the range of the machine.

The duration and strain at each test station is preset on adjusters mounted under the writing table. After setting, the machine is operated by simply pressing the buttons on the console. When maximum strain has been exerted for the preset time interval, the machine automatically releases the load. After the load is released, the timers automatically reset to zero for the next test. The strain on each cable is recorded on large easy-to-read dials. Each dial has two hands; one records strain at any time and the other records the maximum.

The mooring table accommodates up to 50-foot lengths of cable. Tables for longer cable lengths are available. Safety guards are the open type so that the cable may be conveniently inserted.

The Riehle Aircraft Cable Proof Tester meets all specifications of the Bureau of Naval Aeronautics.

WRITE FOR LITERATURE, SPECIFICATIONS AND PRICES

RIEHLE TESTING MACHINES

Division of American Machine and Metals, Inc.

EAST MOLINE, ILLINOIS

"ONE TEST IS WORTH A THOUSAND EXPERT OPINIONS"

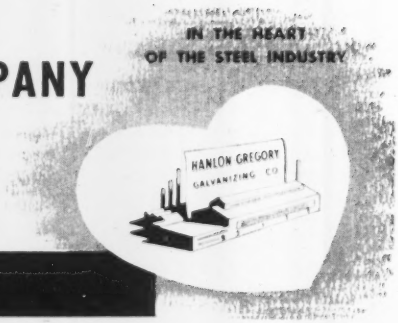
Just as a football player needs protection . . .

IRON and STEEL
***Need* PROTECTION**

If your product is made of iron or steel, and exposed to the elements, protect it against the ravages of rust by Hot-Dip Galvanizing — the best possible rust preventive when applied by Hanlon-Gregory. For longer life, greater uninterrupted service and substantial savings in maintenance, specify Hot-Dip Galvanizing . . . SEAL IT IN ZINC.

HANLON-GREGORY GALVANIZING COMPANY

Pittsburgh, Pennsylvania
The World's largest Job Galvanizing Plant



HOT DIP GALVANIZING

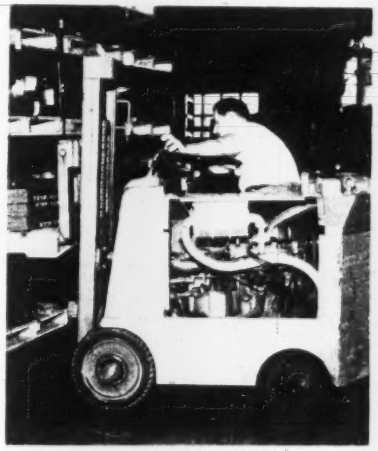
galvanizing . . . pickling . . . painting . . . oiling

No Indoor Exhaust Woes

Replacing lift truck engine mufflers with Oxycat units makes exhaust harmless and odorless

PROBLEM of operating gasoline powered fork lift trucks indoors without danger to employee health was solved by Monroe Calculating Co. when they equipped their units with catalytic exhausts.

When Monroe decided to use fork lift trucks to speed up materials handling at their Orange, N. J., warehouse, it found that from a cost standpoint, gasoline-powered trucks held many advantages. Because the trucks would operate indoors for long periods, management feared that dangerous concentrations of carbon monoxide

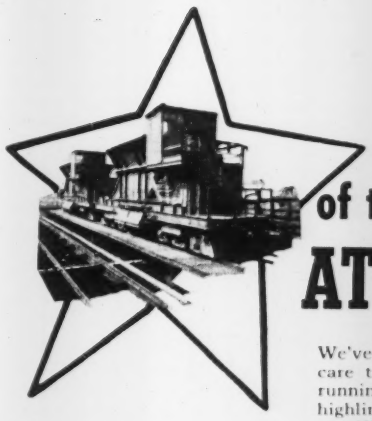


CATALYST UNIT DOES TRICK
. . . tames CO exhaust gases

and other noxious exhaust gases might build up and prove to be a health hazard.

Solution in Mufflers—The problem was solved by replacing the regular truck mufflers with OCM catalytic exhausts. These units, manufactured by Oxy-Catalyst Inc., Wayne, Pa., oxidize more than 95 per cent of the carbon monoxide and hydrocarbons in the truck exhaust, turning them into harmless carbon dioxide and water vapor.

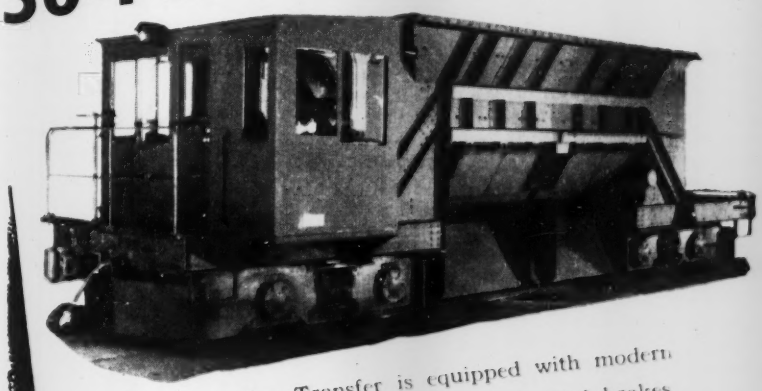
The gasoline-powered trucks proved economical and easy to maintain and have ample reserve power for handling heavy loads of strip, bar and coil steel. At the same time, the OCM catalytic ex-



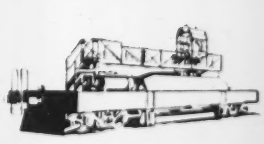
of the "HIGHLINE"
ATLAS ore transfers

We've been building transfers longer than we care to remember . . . most of them are still running. They are the "Star" performers on the highline. We're proud of their ability to meet specific performance requirements of our customers.

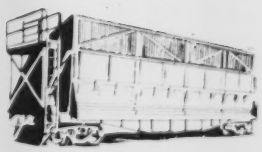
50-TON ORE TRANSFER



This Atlas Ore Transfer is equipped with modern hydraulically operated discharge gates and brakes. Steel plate trucks are provided. The cab is overhung at one side to give the operator a line of vision alongside the car. The car is equipped with electric space heaters.



Scale Cars



Coke Quenchers

THE ATLAS CAR & MFG. CO.
ENGINEERS MANUFACTURERS
1140 IVANHOE RD. CLEVELAND 10, OHIO, U. S. A.

Make Wolverine THE *source*

Here at Wolverine are specialists trained in the production, handling, and fabrication of tubular parts.

They know not only how to produce tube and fabricate it into various shapes for your specific purposes, but they are also familiar with its ultimate uses and the manifold conditions under which tubes normally function.

On these pages are a few concise examples that will serve to show how Wolverine is prepared to contribute substantially in making your operations more profitable.

The use of any of these products or processes will bring you one or more of these advantages which you can pass on to your customers:

DECREASE PRODUCTION COSTS
REDUCE MAINTENANCE COSTS
IMPROVE YOUR PRODUCT
SAVE SPACE THROUGH GREATER COMPACTNESS
INCREASE OPERATING EFFICIENCY

WOLVERINE TRUFIN*

— the integral finned tube

Trufin is recognized for its exceptionally wide range of outside-to-inside surface ratios —thus highly efficient in many heat transfer applications.

Because the fins are extruded from the tube wall itself (actually one and the same piece of metal), vibration or sudden changes of temperature cannot affect the efficiency of the tube.

Choose from wide range of sizes and fin spacings in copper, copper base alloys, aluminum, 1010 welded steel and type 304 stainless steel and also in bi-metal (aluminum fins and copper liners. Liners of other alloys can also be used).

* REG. U. S. PAT. OFF.

Wolverine Trufin and the Wolverine Spun End Process available in Canada through the Unifin Tube Co., London, Ontario.

PARTS MADE BY OUR SPUN END PROCESS†

Countless numbers of tubular parts can be produced better and more economically by the Spun End Process—a unique and very efficient development of Wolverine's. Its adaptation carries with it additional economies beyond its initial production. Fewer assemblies are needed—often entirely eliminated. Range of forms almost unlimited. Send for our Spun End Process brochure and learn how this process can help you.

† A PATENTED PROCESS RE. 22465

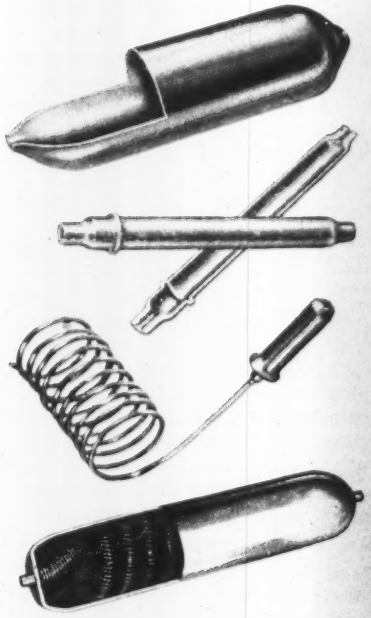
for all your tube requirements

The same tubemanship that has been producing Wolverine nonferrous tubing now for over three decades and is responsible for the high quality that has given Wolverine the fine reputation it enjoys is being devoted also to the manufacture of still another Wolverine product—

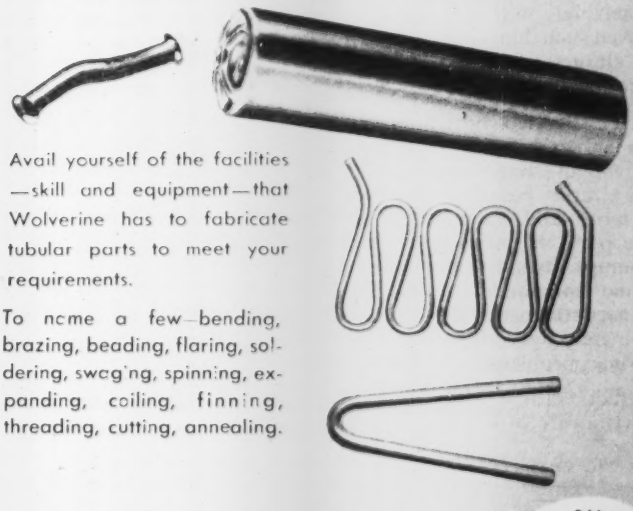
ELECTRIC-WELDED STEEL TUBE

You can buy Wolverine Electric-welded steel tube with the same degree of confidence that you have enjoyed when purchasing our nonferrous tube.

We like to have you think of us as tube specialists. When you think of tube and its uses, always think of Wolverine.



FABRICATED TUBULAR PARTS



Avail yourself of the facilities —skill and equipment—that Wolverine has to fabricate tubular parts to meet your requirements.

To name a few—bending, brazing, beading, flaring, soldering, swaging, spinning, expanding, coiling, finning, threading, cutting, annealing.

WOLVERINE TUBE DIVISION

of CALUMET & HECLA, INC.

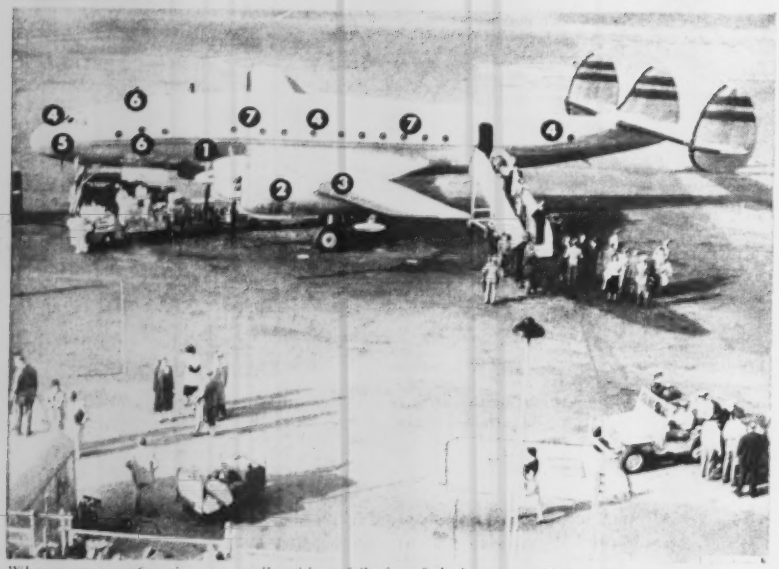
Manufacrurers of Quality-Controlled Tubing

1439 CENTRAL AVENUE • DETROIT 9, MICHIGAN

ESTABLISHED 1916

Plants in Detroit, Mich. & Decatur, Ala. *Sales offices in Principal Cities*

(Advertisement)



When parts must function repeatedly without fail, aircraft designers specify beryllium copper, a unique alloy with a multitude of desirable properties. This Lockheed Constellation serves to show where beryllium copper parts can be found in many modern airliners. For parts, see below.

VERSATILE BERYLLIUM COPPER

The aircraft industry makes wide use of this alloy's ability to do many jobs

In World War II, Berylco beryllium copper was drafted for the production war on many fronts. It did amazingly well. For aircraft, it improved such things as radar equipment, altimeters, valve guides, plug type connectors.

Today Berylco beryllium copper is an engineering material in wide demand—one of growing value to the aircraft industry. It is being used more and more for critical engine parts, from bushings to jet fuel pumps. Its use results in better airframe components as well as more accurate instruments. It helps solve increasingly tough radar and electronics problems.

In fact, nearly every industry today is aware of the part Berylco can play in making better, cheaper products. By offering the designer combinations of such desirable properties as elasticity, fatigue resistance, strength and conductivity, Berylco can often solve design problems involving conflicting requirements. And it can do so at low cost and with the utmost reliability.

The supply picture today is brighter than ever before. Now you can be certain of getting the material you need for *your* application. You can also, for the cost of a phone call, get the know-how and experience of the world's largest producer of beryllium copper. For full information, address your inquiry to THE BERYLLIUM CORPORATION, Dept. 31, Reading 19, Pa.

Tomorrow's products are planned today—with Berylco beryllium copper

These Berylco parts—a few of those used in modern planes—are numbered to indicate where they appear in the large photograph. (1) Propeller bolts; (2) fuel injector; (3) de-icing stud; (4) instrument switch part; (5) instrument diaphragm; (6) connectors, plug-type and coaxial; (7) safety belt release.

haust has maintained clean, safe air in even the most confined areas, and not one case of nausea, headache or other complaint was received.

How It Works—Heart of the catalytic exhaust is the cartridge of spaced porcelain rods coated with a catalytic agent—catalytic alumina and platinum alloy. The engine exhaust flows across the surface of these rods where combustion of the carbon monoxide and other harmful vapors takes place.

On leaving the catalyst the exhaust contains mostly carbon dioxide and water vapor. The slight trace of contaminants remaining is far below the U. S. Public Health Service tolerance of 100 ppm for eight hour exposure and 400 ppm for one hour exposure.

Any Engine—Exhaust unit can be used on any engine—mobile or stationary—which burns unleaded gas, and it can also be easily adapted to LP engines. It successfully prevents the harmful psychological and physiological symptoms of excess carbon monoxide.

OCM catalytic exhausts come in standard sizes for any make or size of fork lift trucks. Space requirements for installation of a unit are approximately the same as for the regular muffler which it replaces.

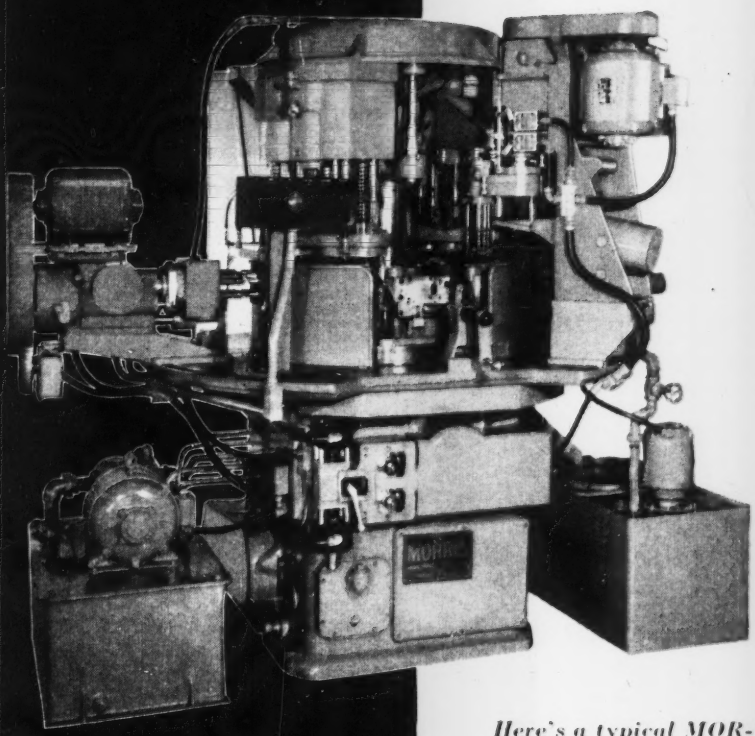
Versatile Broaching Machine

A versatile air-powered broaching fixture designed to cut broaching equipment costs and speed delivery is announced by National Broach & Machine Co., Detroit. The horizontal self-contained fixture will broach holes, keyways and contours on a wide variety of production parts. The compact fixture consists of a cast iron base with two integral vertical flanges. A 5-inch diameter air-hydraulic cylinder having a 25-inch stroke is mounted on a flange at one end of the base. The other flange in the middle of the base supports the work rest plate. Two hardened and ground steel guide bars supported by the two flanges guide an automatic broach puller mounted on the end of the air cylinder rod.

Linear ball bushings are provided in the puller head guide holes to promote long wear life and reduce friction loads.

how little does it cost...

to get "special machine" production with combination standard units?



Producing 170 finished transmission control valve bodies per hour at 100% efficiency, this machine performs 32 drilling and tapping operations in two cycles.

Here's a typical MOR-SPEED answer to an ever-more important problem:

A combination of Morris standard units . . . center column, base, indexing mechanism and hydraulic units . . . plus a made-to-order vertical and auxiliary side heads . . . make up this high production machine. Cost is less, delivery faster . . . the user gets the accuracy and low cost production of a "special" without the usual sky-high costs and limited application of conventional units.

Consider the multiple savings . . . investment, labor, time and floor space . . . of MOR-SPEED multiple machining. Let Morris Engineers prove that high production *and* precision can be yours for less than you might imagine.

a better product at less cost with precision - plus production

Bullard MOR-SPEED Line

Morris

THE MORRIS MACHINE TOOL CO.

941 HARRIET ST., CINCINNATI 3, OHIO

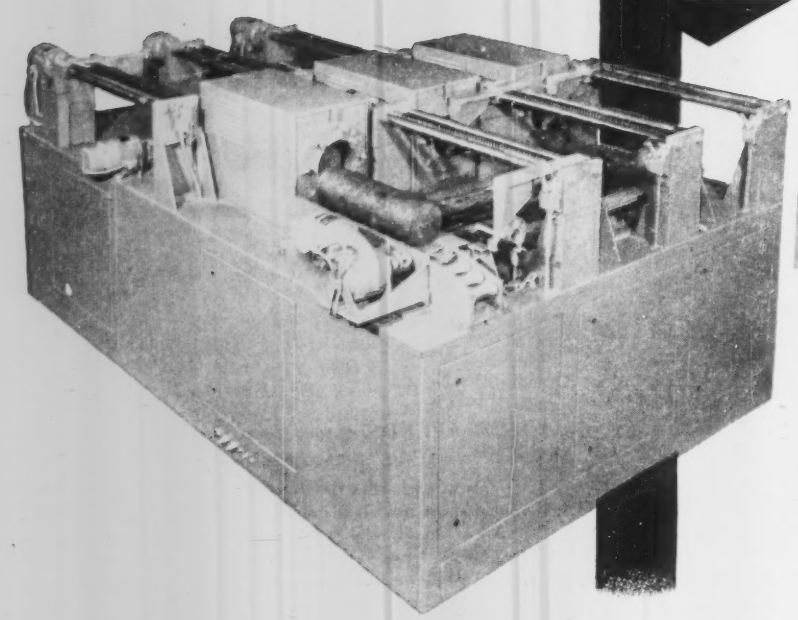
the first completely universal....

60-cycle **induction**

BILLET HEATER

THIS Loftus Universal Thermo-Induction furnace is the most flexible 60-cycle billet heater ever designed. You can heat every non-ferrous metal, in the same furnace, either consecutively or simultaneously, to its respective forging or extrusion temperature. The unit maintains high efficiency, constantly, even when heating **short-length** billets.

Loftus Thermo-Induction gives you the most practical, dependable, and efficient method of heating non-ferrous metals. You achieve uniform heating in a matter of seconds. Production is continuous, and completely automatic. The press operator controls the furnace. Separate, positive control of each coil is at his fingertips.



The Loftus 60-cycle Thermo-Induction Heater illustrated is designed to heat copper, brass, aluminum, and cupro-nickel for extrusion purposes. The unit is readily adaptable for forging and rolling processes. It is possible, with this billet heater to heat a 5" dia. Aluminum billet to 800° F., an 8" dia. brass billet to 1550° F., and a 10" dia. cupro-nickel billet to 1950° ALL AT THE SAME TIME, IN THE ONE FURNACE. Each billet is heated independently . . . from a single control panel.

Send Today for Booklet describing Loftus 60 Cycle Induction Heating in Detail

Loftus **ENGINEERING CORPORATION**

Designers and Builders of Industrial Furnaces

610 Smithfield Street • Pittsburgh 22, Pennsylvania

NEW PRODUCTS and equipment

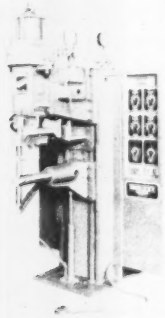
Reply card on page 161 will bring you more information on any new products and equipment in this issue

Three-Phase Spot Welder

. . . 1500-4000-pound force

SPT 2 welding machine is one of a series of three-phase spot welders available in 50, 75 and 100 kva at 50 per cent duty cycle. Model can be supplied in 18 to 60-inch throat depth and 1500 to 4000-pound maximum electrode force.

Welder will accommodate large production runs on two thicknesses of clean mild steel in minimum



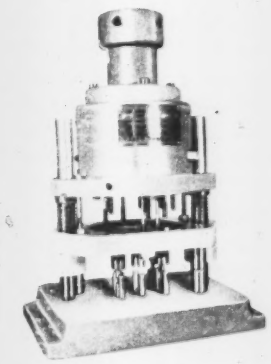
0.020 and maximum 0.102-inch gages. In stainless, it takes minimum 0.020 and maximum 0.062-inch; in aluminum, minimum 0.025 and maximum 0.072-inch. Model can also weld many other types of materials and alloys, such as brass, everdur, heat resistant alloys, coated steel, etc., within limits of electrode force and secondary current. Sciaky Bros. Inc., Dept. ST, 4915 W. 67th St., Chicago 38, Ill.

FOR MORE DATA—CIRCLE REPLY CARD NO. 1

Self-Cleaning Drill Jigs

. . . entire line standardized

Complete standardized line of self-clamping drill jigs is developed for use in conjunction with the manufacturer's gearless multiple spindle drill heads. These jigs can be used with the drill heads to perform drilling, reaming and tapping on standard presses and tapping machines. Four types accommodate various work piece



sizes, handling hole patterns from 3 to 15 inches in diameter.

When used on drill presses equipped with power feeds and automatic cycling, units achieve maximum production because the operator handles parts only. Standardization is important because only a few parts need to be engineered and specially made. Zagar Tool Inc., Dept. ST, 24000 Lakeland Blvd., Cleveland 23, O.

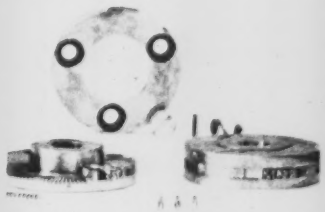
FOR MORE DATA—CIRCLE REPLY CARD NO. 2

Steel Roller Stamp

. . . permanent metal marking

This steel roller stamp is adaptable for use in regular marking machines, ordinary screw machines or lathes. It is precision made, allows the user to select and vary information to be marked by means of interchangeable tapered type inserts supplied with the holder. Retaining ring fits over the type inserts and holds them in place, yet provides for quick and easy changes.

Special locking feature of the Roliner marker prevents type slippage that sometimes results from hard and repeated roller marking.



Acme Marking Equipment Co., Dept. ST, 8030 Lyndon, Detroit 21, Mich.

FOR MORE DATA—CIRCLE REPLY CARD NO. 3

Infra-Red Oven

. . . for large-area applications

This infra-red oven is designed for larger installations, and is equally well suited for both conveyorized and nonconveyorized batch oven work. Design permits tight multiple section joints, with each section individually adjustable from the outside. Each lamp row has two complete panels of asbestos - insulated metal - backed construction to retain heat.

Oven is installed so contour can be changed while it is in actual operation. Thus every lamp in the oven can be positioned directly to the work. An occasional wiping of lamp bulb faces is the only cleaning required. Wil-Son Mfg. Co., Dept. ST, Cloverport, Ky.

FOR MORE DATA—CIRCLE REPLY CARD NO. 4

Hydraulic Accumulator

. . . single and double shell

Cylindrical type hydraulic accumulator units are made in both single and double shell construction and are recommended for in-

stallations involving pressures up to 3000 psi. Design conforms to Military spec drawing MS 28709; units meet requirements of MIL-A-5498.

Design features include pressure-balanced inner cylinder, free-floating piston, warning vents and

forged end caps with internal threads. Sizes range from 12½-inch over-all, 2¼-inch cylinder and 8 13/16-inch stroke to 33 3/8-inch over-all, 4½-inch cylinder and 27 7/8-inch stroke. Parker Aircraft Co., Dept. ST, 5827 W. Century Blvd., Los Angeles, 45, Calif.

FOR MORE DATA—CIRCLE REPLY CARD NO 5

Ultraviolet Instrument

. . . fast flaw or crack tests

Compact Blacklight Wand model is an addition to the manufacturer's series of Fluoretor portable ultraviolet instruments. The instrument is a tubular unit resembling

large flashlight in appearance. Size reduction of electronic components has enabled comparable reduction of total weight to only 1¾ pounds.

Factors of ready portability and independence from normal power outlets make the instrument particularly useful in field work on such jobs as materials testing. Menlo Research Laboratory, Dept. ST, Box 522, Menlo Park, Calif.

FOR MORE DATA—CIRCLE REPLY CARD NO 6

Dew Point Controller

. . . completely automatic cycles

Automatic controller regulates dew point in controlled atmosphere metal treating furnaces. Self-contained unit operates electronically, continuously recording and controlling. The instrument makes possible completely automatic heat-treating cycles such as carburizing and carbon restoration.

Adjustable to meet any required

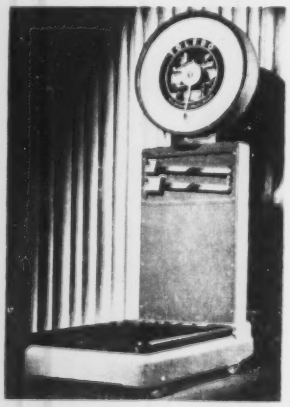
dew point within capacity of the particular furnace to which it is attached, the controller pumps furnace atmosphere through a 5/16-inch steel tube. Cooling element condenses water on a measuring device; condensation temperature is then measured. Ammonia in furnace atmosphere does not harm or affect accuracy. Instrument requires no calibrating. Ipsen Industries Inc., Dept. ST, 715 Main St., Rockford, Ill.

FOR MORE DATA—CIRCLE REPLY CARD NO 7

Industrial Scale Line

. . . no more hand adjustment

Full range of models from bench to motor truck scales features one-piece sectors in full-floating



double pendulum mechanism. This construction is reported to increase precision and strength, and eliminate hand adjustment.

Indicating hands can be installed to face any one of eight different directions; or a scale can be ordered with head that swivels through complete 360 degrees.

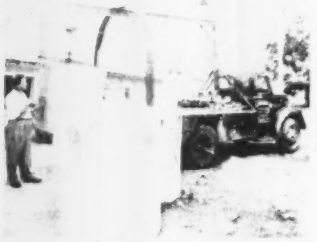
Improvements in the portable model include 18 per cent larger platform, with over-all dimensions of scale base reduced and wheels within base dimensions. Bench models have 31 per cent larger platforms, reduced over-all scale width and depth. Toledo Scale Co., Dept. ST, Telegraph Rd., Toledo 1, O.

FOR MORE DATA—CIRCLE REPLY CARD NO 8

Battery-Operated Hoists

. . . truck-mount application

Line of battery-operated Budgit hoists is developed especially for mounting on trucks to make available on-the-spot lifting wherever



needed. Hoists can be installed on trucks equipped with a 6-v electrical system by adding another 6-v battery. Units are available in capacities of 1000, 2000 and 4000 pounds. Shaw-Box Crane & Hoist Division, Manning, Maxwell & Moore Inc., Dept. ST, Muskegon Mich.

FOR MORE DATA—CIRCLE REPLY CARD NO 9

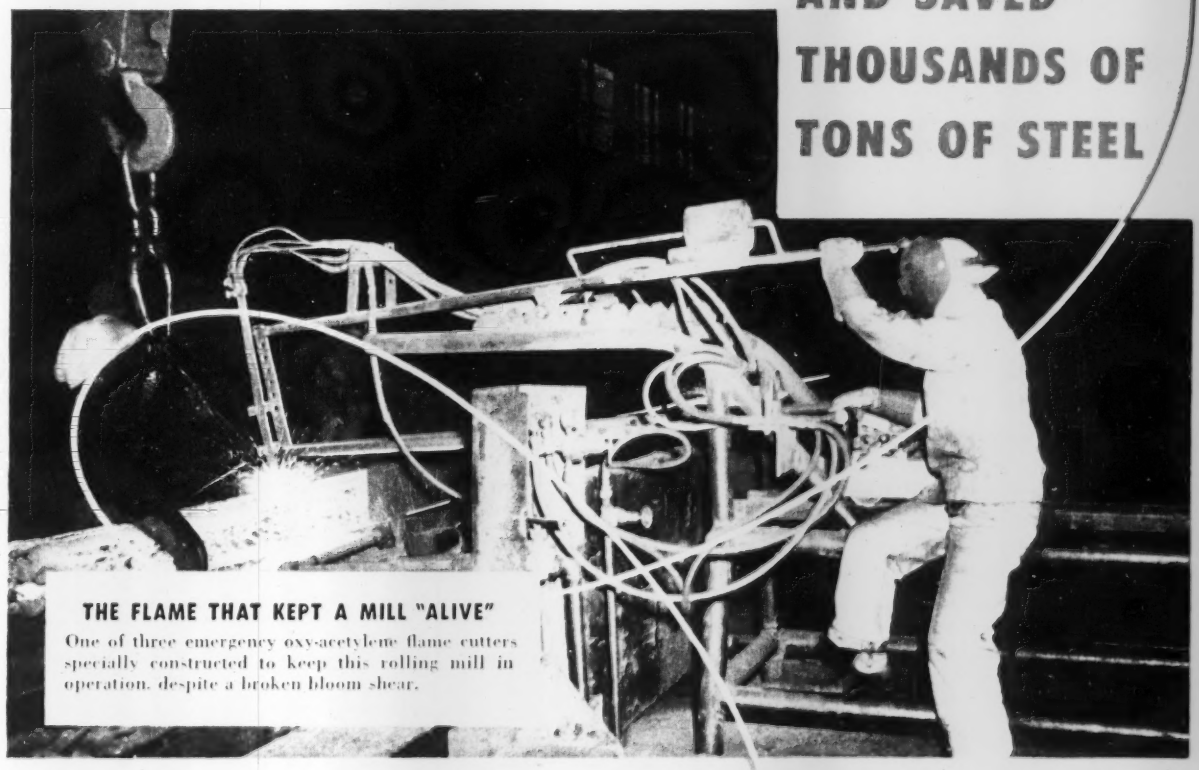
Fire-Preventive Parts Cleaner

. . . placed wherever convenient

Foot treadle fire-preventive dip tank for washing castings, parts assemblies and similar moderate-

size production pieces can be placed safely beside a worker at any plant location where convenience dictates. Dip tank is waist high for use without bending.

How Oxygen...and LINDE SERVICE* HELPED PREVENT A MILL SHUTDOWN... AND SAVED THOUSANDS OF TONS OF STEEL



THE FLAME THAT KEPT A MILL "ALIVE"
One of three emergency oxy-acetylene flame cutters specially constructed to keep this rolling mill in operation, despite a broken bloom shear.

In a major steel plant, the bloom shear in a rolling mill was badly damaged. Repair time was estimated at six weeks. Meanwhile, the mill would be shut down.

The mill management called LINDE SERVICE for assistance in applying oxy-acetylene flame cutting as a replacement for the shear. Three emergency hot-cutting machines were constructed to LINDE design and specifications. Result? The mill was back in production within three days.

This "temporary" operation was in service three and a half months. During that time many thousands of tons of steel were rolled by a mill that would have been shut down if it weren't for oxygen . . . and an assist by LINDE SERVICE.

If you use oxygen in your operations, LINDE SERVICE *can mean dollar savings to you. Let us tell you more about it.*

LINDE AIR PRODUCTS COMPANY
A Division of UNION CARBIDE AND CARBON CORPORATION
30 East 42nd Street New York 17, N. Y.
Offices in Principal Cities
In Canada: Dominion Oxygen Company, Limited, Toronto

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is the unique combination of research, engineering, and more than 40 years of accumulated know-how that is helping LINDE customers save money and improve production in their uses of oxygen and oxy-acetylene processes.

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CHANDLER fasteners are manufactured to the highest standards of precision, uniformity and economy of assembly. **CHANDLER** specializes in one thing only . . . cold forged metal fasteners of the finest alloy steel, made to exacting specifications.

CHANDLER is prepared to render highly specialized or standard fasteners to your complete satisfaction. To make assembly faster, every fastener must pass rigid inspection, insuring uniformity, accuracy and good appearance.

CHANDLER supplies every industry with the very finest cold forged precision cap screws. Automotive, aviation, transportation, farm implement . . . whatever your needs — **SPECIFY CHANDLER.**

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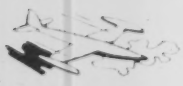

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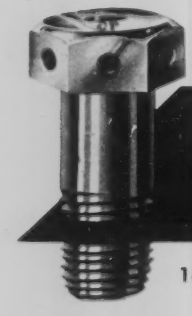

Specialists in Thread-Rolling after Heat-Treating

CHANDLER PRODUCTS CORPORATION

1488 CHARDON ROAD • CLEVELAND 17, OHIO

NEW PRODUCTS and equipment

Tank measures 13 x 24¾ x 8¾ inches, has working capacity of 8 gallons of solvent and is made of terne plate electrically seam welded. Hinged cover is self-closing; tank can be used only when foot is on the treadle. Protectoseal Co., Dept. ST, 1920 S. Western Ave., Chicago 8, Ill.

FOR MORE DATA—CIRCLE REPLY CARD NO. 10

Hydraulic Hose Selector

. . . determines proper specs

Starting with any known factor —such as ID, OD, minimum burst, working pressure required, or bend radius—a designer or maintenance

man can use this hydraulic hose selector to determine proper rubber-covered hose for a specific operation. The selector is offered without charge. Republic Rubber Division, Lee Rubber & Tire Corp., Dept. ST, Youngstown 1, O.

FOR MORE DATA—CIRCLE REPLY CARD NO. 11

Variable-Speed Transmissions

. . . more power, same size

Model 28 infinitely variable speed drive increases power about 50 per cent over the manufacturer's previous models, but is approximately the same size. It em-

USE A REPLY CARD

Just circle the corresponding number of any item in this section for more information.

INFORMATION

AVAILABLE FOR THE ASKING

68. Plastic Gasketing

U. S. Stoneware Co.—Tygon corrosion-resistant gasketing, composed of modified polyvinyl resins, is subject of illustrated bulletin G-520. Material is available in sheet, tubing, solid cord, diaphragms, die-cut, cut and molded gasketing. Physical properties are fully discussed and formulas are tabulated.

69. Snagging & Grinding Wheels

Cleveland Quarries Co., Sterling Grinding Wheel Div.—Resinoid bond snagging and grinding wheels are described in illustrated bulletin. Types shown are for both stationary and portable grinder applications. Tabular wheel recommendations are included for different metals and machines.

70. Pallet-less Handling

Yale & Towne Mfg. Co.—Special steel plate and fork truck equipped with a pusher attachment comprises the Pak-Loader system for handling materials in unit loads without use of pallets. System is detailed in illustrated bulletin P-1173-A. Actual operation is shown.

71. Clamp Assemblies

Lodding Inc.—58-page spiral bound catalog offers information on line of clamp assemblies and fixture details. Components necessary to standardize tool engineering practice are presented, along with full scale layouts. Cross sectional diagrams and specifications are given.

72. Reclaiming Castings

Metallizing Co. of America—Advantages of the Dot Weld low temperature welding process for the reclaiming of castings are given in detail in 8-page booklet. Information on equipment and cost, plus case histories are presented.

73. Machine Tool Drives

Western Manufacturing Co.—For motorizing cone driven standard or special machines, machine tool drives are described on illustrated data sheet. Various models accommodate motors between 1 and 15 hp, with multiple speeds and right or left hand output. Transmissions for plate or platform mounting are also briefly noted.

74. Locomotive Cranes

Orton Crane & Shovel Co.—Construction features of the Orton torque control locomotive cranes are outlined in 16-page illustrated catalog No. 84. One outstanding feature is torque control unit. Dimensions, capacities and other data are included.

75. Twine Sealing Machine

United States Steel Corp., Gerrard Steel Strapping Div.—Photos in 4-page folder show typical applications of both the 10-in. model 0400 and 14-in. model 0101 automatic twine sealing machines. Package capacities are, respectively, 10 x 7 in. and 14 x 9 in., unlimited length.

76. Metal Hose

Universal Metal Hose Co.—20-page illustrated technical data book U-111 affords information on application and temperature ranges of various types of metal and wire braided hose, couplings and assemblies. Seamless flexible metal, annularly corrugated flexible metal, interlocked flexible metal and synthetic flexible hose types are covered.

77. Grease Research

National Lead Co., Baroid Sales Div.—Bentone greases are studied in Research & Development Laboratories Technical Release No. G-la-52. Various experiments show the effect of oil bases on oxidation characteristics, milling and working properties of greases in various oils, and effect of dispersion additives.

9-21-53

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78. High Temperature Pipe

United States Steel Corp., National Tube Div.—Technical data on pipe and tubes for elevated temperature service are found in 66-page wire-bound bulletin No. 26. Much information is in table and graph form for a long list of steels.

79. Hydraulic Pumps, Controls

Vickers Inc.—Pumps; pressure, volume and directional controls; control assemblies; hydraulic motors; transmissions; cylinders; and hydraulic accessories are effectively described and specified in 56-page illustrated catalog 5001. Items designated JIC encompass Joint Industry Conference standards directed toward ease of maintenance, safety, long life and uninterrupted production.

80. Shock Insulation

Fabreeka Products Co.—General properties of Fabreeka, a resilient material for reducing shock, vibration and noise, are outlined in 36-page illustrated booklet. Wide variety of machinery and transportation applications are described, and many technical data given.

81. High Vacuum Pumps

F. J. Stokes Machine Co.—"Microvac Pumps For High Vacuum" is title of well-illustrated 36-page brochure No. 750. In addition to giving specs and showing installations of many different units, brochure has valuable tables of constants, formulas, and conversions used in vacuum processing. Applications illustrated include metallization and impregnation of various products, and extrusion of clay products.

82. Pneumatic Products

C. A. Norgren Co.—A file type catalog, 60-page form No. A-500 contains a wealth of illustrated data on filters, valves, regulators, hosing and other similar products for pneumatic service. Each item is given full page treatment, separately illustrated and described.

83. Metal Disintegration

Clinton Machine Co., Metalmaster Div.—In operations manual on the model 952 metal disintegrator are given a series of general operating instructions and hints for this machine. Manual helps operator become efficient at the various machine functions, which include arc and cold welding, and removal of taps, drills and other broken tools.

84. Thread Inserts

Heli-Coil Corp.—22-page bulletin No. 652 indicates the applications of wire thread inserts both in replacement and original design. Inserts are either of phosphor-bronze or stainless steel, and are now available in Classes 2, 2B, 3 and 3B fits. Much design information is given.

85. Press Fabrication

Clearing Machine Corp.—In 24-pages, well-illustrated brochure "The Hall of Giants" shows how large Clearing presses are made. Pictures show planning, layout, machining and assembly, and then disassembly and shipping. Last double page illustrates typical presses from the wide company line.

86. Industrial Steam Trap

W. H. Nicholson & Co.—Type D thermostatic bellows steam trap is featured in bulletin No. 351. Constructed of bronze, trap is made in ¼, ⅜, ½ and ¾-in. angle type for pressures from vacuum to 200 psi.

EDITORIAL ARTICLES
Available in Limited Quantities

87. Truck Safety Program

W. A. Meddick, Vice President of Elwell-Parker Electric Co., tells how to "Stop Truck Accidents Before They Occur" in STEEL article of this title. Sharp training and a tough operating code are emphasized, and tips on what to stress and where to enforce rules, are given.

88. Induction Forging

"Induction Forging Can Be Versatile," according to STEEL article by F. T. Chesnut, Ajax Electrothermic Corp. Wide variety of parts coming off presses at Massey-Harris focuses new light on these production heaters. Big library of fixtures is key to speedy changeovers.

89. Aluminum Weathering Tests

Outdoor weathering tests made on wrought and cast aluminum and Alclad structural surfaces show thin protective oxide film is formed after initial penetration. Attack then tends to go laterally along surface. C. J. Walton, C. O. Sprowls and J. A. Nock, Jr. of Aluminum Research Laboratories present test results in STEEL article "Aluminum 'Self-Stops' Corrosion."

90. Quick Steel Analysis

Quantometer installations at two Crucible Steel works give melters better control over characteristics of various heats. Test results come back in matter of minutes. The story is in STEEL reprint "Quick Analysis Leads to Better Steel."

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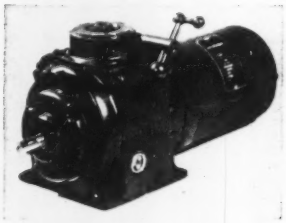
NEW PRODUCTS and equipment

ploys a two-piece housing with integral base, improved control that provides linearity.

Model delivers all speeds from any desired maximum to zero. Speed can be changed with the



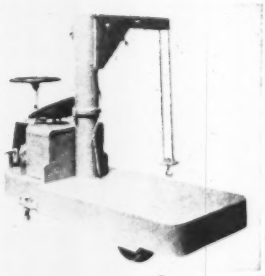
transmission running or stationary. Drive incorporates built-in overload protection that protects both itself and the driven machine in event of excessive overload. Graham Transmissions Inc., Dept. ST, Menomonee Falls, Wis.

FOR MORE DATA—CIRCLE REPLY CARD NO. 13

Revolving Crane Truck

. . . boom travel: 180 degrees

This truck model has applications in handling molds and other equipment in storage for miscellaneous work. It has capacity of



2000 pounds and over-all 68-inch height. Its hook, 60 inches high when raised and 10 inches when lowered, projects 24 inches over either side of the truck and is raised and lowered by power.

Power operation is furnished by a separate pump and motor that

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for a fabulous finish...

JEWEL BRAND

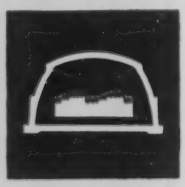
Abrasive Belts

for grinding, sanding, polishing — metal, wood, leather, plastics, rubber

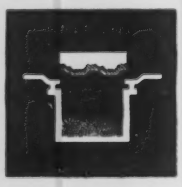
ABRASIVE PRODUCTS, INC.
511 Pearl Street
South Braintree 85, Massachusetts

NEW general-purpose shell gives greater latitude

Bakelite Company announces the development of a new general-purpose shell molding resin that *can be subjected to a greater variation in operating conditions than ordinary shell molding resins.*

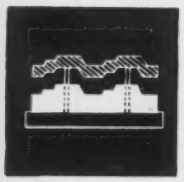


Shell molds bonded with this resin reach minimum usable strength in the curing operation faster than molds made with ordinary resins. They also retain their strength for longer periods at curing temperatures, permitting greater leeway in curing time.



This new BAKELITE phenolic resin reduces the tendency of the resin-sand mixture to fall off the pattern plate during the inverting operation.

Shell molds made with this new resin resist the tendency to distort upon ejection from the hot pattern plate, insuring better mating of mold halves. This hot rigidity is obtained without sacrificing toughness

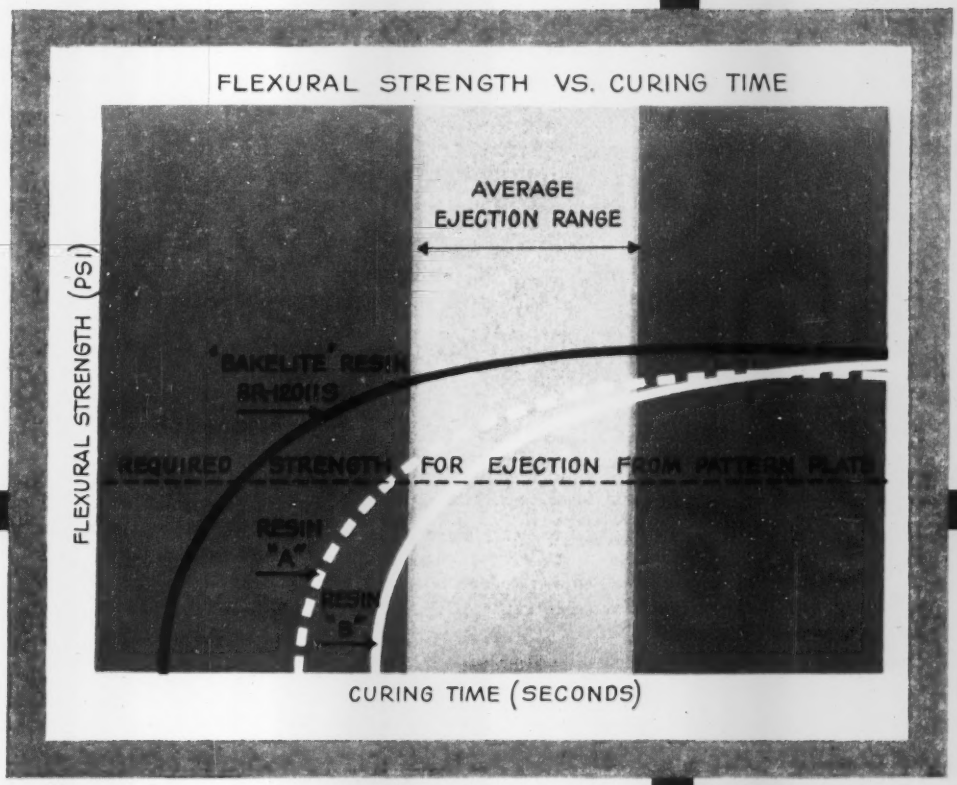


and provides molds that are more dimensionally stable, and which resist deformation during the pouring operation.

Field and laboratory tests of molds made with BAKELITE phenolic resins reveal a direct correlation between resin particle size and mold strength. In common with other BAKELITE phenolic shell molding resins, the new resin is finely ground, and is uniform both as to particle size and batch-to-batch production. The fine uniform particles give greater coverage per pound of resin. Smaller quantities of resin are needed to reach minimum usable strength, with resulting economies. This uniformity also eliminates the need for foundrymen to make extensive adjustments in formulation during production operations.

Shell molding produces castings with close tolerances, almost pattern-smooth, that reduce machining and finishing operations, speeding production and cutting costs. While your plans are still in the design stage, ask your foundryman how this new process can improve your operations. Also, write Dept. QI-49, for further information on BAKELITE Phenolic resins developed expressly for shell molding.

molding resin in mold-making

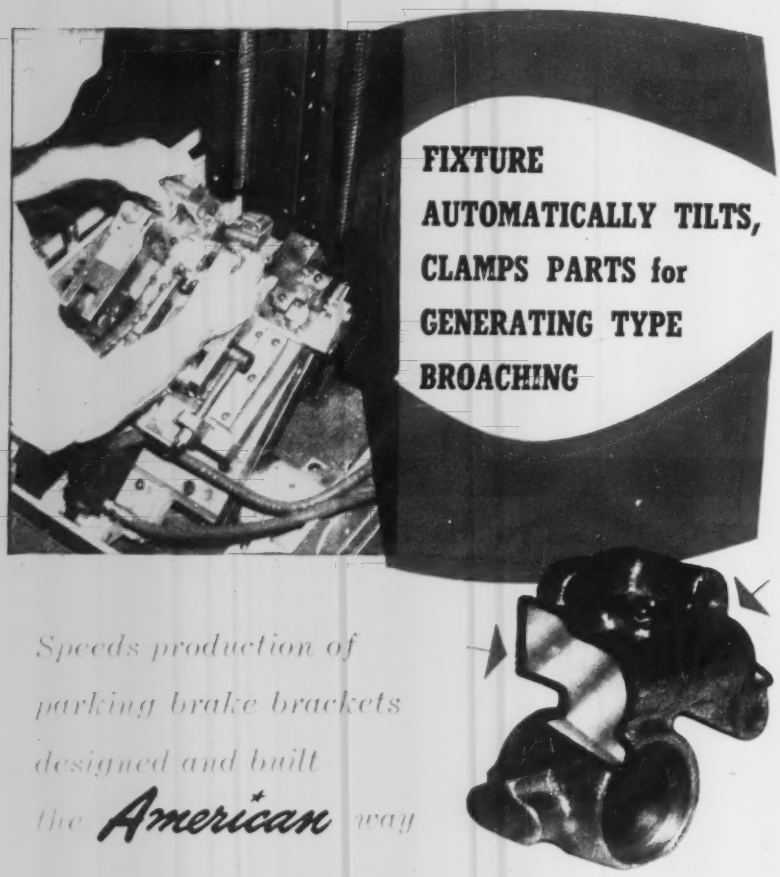


BAKELITE Resin BR-12011S is resistant to distortion upon ejection from the hot pattern plate because of its high flexural strength when hot. Shell molds produced with this material will reach a minimum usable strength faster than ordinary shell molding resins, and will retain a strength in excess of this minimum for longer periods while still at curing temperatures.

BAKELITE
TRADE MARK
RESINS FOR SHELL MOLDING

TRADE MARK

BAKELITE COMPANY
A Division of
Union Carbide and Carbon Corporation
UCC
30 East 42nd Street, New York 17, N. Y.
In Canada:
Bakelite Company (Canada) Ltd., Belleville, Ont.



FIXTURE AUTOMATICALLY TILTS, CLAMPS PARTS for GENERATING TYPE BROACHING

Speeds production of parking brake brackets designed and built the ***American*** *way*

Two parallel surfaces on each of two parts are straddle broached in one pass on this American SB-42-10 single ram broaching machine. Over 350 of these intricate parking brake brackets are completed every hour.

The complete tooling designed the American Way features:

1. Generating type broaches.
2. Fully automatic work holding fixture with tilting table.
3. Automatic clamping and unclamping of parts.

The operator simply loads and unloads the parts, starting each machine cycle by push button control.

For the answer to your broaching problem send a part print or sample and hourly requirements to American . . . the organization that gives you the extra advantages of experience in producing all three . . . broaches, machines and fixtures. No obligation. Address Dept. S.

For more information on the American SB-42-10 and other American machines, write for Circular 2500.

American BROACH & MACHINE CO.
A DIVISION OF SUNDSTRAND MACHINE TOOL CO.
American Building - Ann Arbor, Michigan

SUNDSTRAND

NEW PRODUCTS and equipment

pumps fluid into a double-acting ram inside the main mast. A double-acting ram is also used so the hook, whether loaded or empty, will lower at a safe speed without depending upon gravity. Boom has complete angular travel of more than 180 degrees. Market Forge Co., Dept. ST, Everett, Mass.

FOR MORE DATA—CIRCLE REPLY CARD NO. 14

Powered Wheelbarrow

. . . uses platforms or bucket

Electric starting ¾-ton capacity model is an addition to the manufacturer's line of powered wheelbarrows. Only 32-inches wide, it moves easily through standard

doorways and maneuvers in confined areas.

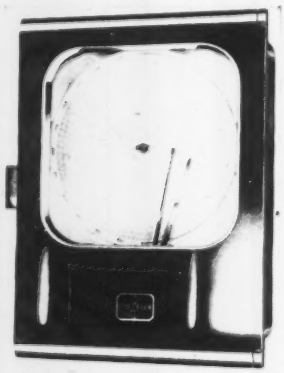
Two flatbed platform sizes are interchangeable with the 10-cu-ft bucket for moving heavy maintenance items as well as hauling scrap and refuse. Prime-Mover Co., Dept. ST, Muscatine, Iowa.

FOR MORE DATA—CIRCLE REPLY CARD NO. 15

Electronic Controllers

. . . indicate temperature, flow

Line of Free-Vane electronic controllers is available as indicating or recording controllers for



temperature, pressure, flow, liquid level, humidity and time program-

THE BURLINGTON LIARS' CLUB

SPINS A YARN FOR BAKER'S MAGDOLITE

FINDERS KEEPERS

After going to bed one night, a G.I. stationed in Japan, heard the barracks door open. Assuming the noise was made by some of his buddies returning, he paid no attention to it. Suddenly, two large shadows fell across his cot and he looked up. Standing beside him were two mosquitoes well over six feet tall!

Too frightened to move, the G.I. lay there petrified while the mosquitoes spoke: "Shall we eat him here or take him home?" said one. "Don't be silly", replied the other. "You know very well if we carry him home the big mosquitoes will take him away from us!"

"Finders Keepers", the title of this story, reminds us of our customers. Once they *find* out how good BAKER'S MAGDOLITE is, they *keep* ordering it again and again.

Why don't you join the long list of satisfied customers who have learned to rely on BAKER'S MAGDOLITE—the original dead-burned dolomite? Try it . . . find how its superior chemical, physical, and mineralogical composition assures ingot uniformity and reduces maintenance costs. We know you'll keep specifying BAKER'S MAGDOLITE, the dolomite which continued research has made 5 ways better: Composition, Preparation, Economy, Strength, Quality.

JEBCo

PRODUCTS
SINCE 1889

MAKERS OF BAKER'S MAGDOLITE

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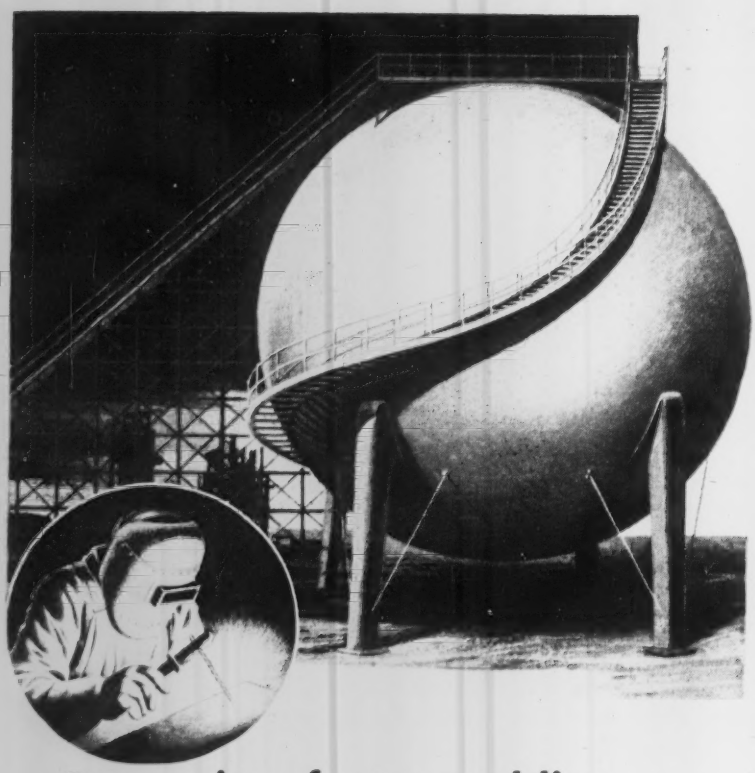
THE J. E. BAKER COMPANY

YORK, PENNSYLVANIA

Plants: York, Billmeyer, Pennsylvania—Millersville, Ohio



For **easier, faster welding**
use one electrode for all positions

Gas or liquid retaining hortonspheres are welded in the field. In the process, every welding position is used—downhand, vertical and overhead. Today, because *one electrode* can produce sound weld metal from every position, considerable time is saved by eliminating frequent electrode changes.

You can profit from this same advantage by using Arcos Low Hydrogen Electrodes for welding high tensile steels. With few exceptions, once you select the proper electrode, you can keep on welding with *one electrode*—no need to change electrodes for different welding positions. Besides saving time, inventory can be simplified. Arcos quality controls, highest in the industry, assure you dependable, uniform weld metal for every application. Write for "The ABC's of Welding High Tensile Steels".

ARCOS GRADE	A. W. S. SPEC.
Tensilend 70	E7016
Tensilend 100	E10016
Tensilend 120	E12015
Manganend 1M	E9015
Manganend 2M	E10015
Nickend 2	E8015
Chromend 1M	E8015
Chromend 2M	E9015

ARCOS CORPORATION, 1500 South 50th Street, Philadelphia 43, Penna.

WELD WITH ARCOS
LOW HYDROGEN ELECTRODES

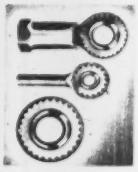
ming. They use the company's standard measuring elements.

Based on a principle of frequency modulation, controllers are offered for low-open, high-open, low-high, low-open-high or low-normal-high control, as well as proportional input control. Various combinations of one or two recording pens or indicators with one or two control units in one case make the units adaptable to a wide range of control problems. Bristol Co., Dept ST, Waterbury 20, Conn.

FOR MORE DATA—CIRCLE REPLY CARD NO 16

Spherical Bearings

. . . with ball race adjustment



Spherical bearings and spherical rod end bearings, called Adjusta-Ball, have means for adjusting ball race to provide thoroughly accurate positioning of the bearing. This not only gains maximum correction of misalignment, but increases service life since proper adjustment can always be made to compensate for wear.

Each bearing race insert is so designed that it can be adjusted to any desired degree of relationship to the ball. By use of a spanner wrench inserted in the notches on the outer edge, race can be tightened or loosened, with one notch adjustment slightly less than 0.001-inch. All bearings are prelubricated. Lincoln Park Industries Inc., Dept. ST, 1719 Ferris Ave., Lincoln Park 25, Mich.

FOR MORE DATA—CIRCLE REPLY CARD NO 17

Universal Pallet Dolly

. . . rolls without casters

This dolly rolls and steers over any type floor without any swivel casters. Its maneuverability, operating ease and ability to roll on rough or slatted floors are advantages of improved design.

Twenty-four 6-inch wheels support the load and provide surface contact over rough surfaces. Wheels are available with rubber tread or aluminum alloy tread to

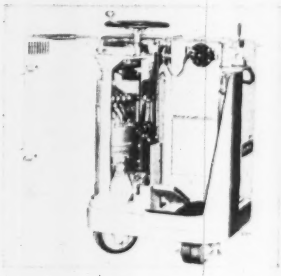
fit varying operating conditions. Front and rear wheels are mounted on spring-loaded axles. Standard sizes are 30 x 40 and 40 x 48 inches. Roll Rite Corp., Dept. ST, 801 Jefferson St., Oakland, Calif.

FOR MORE DATA—CIRCLE REPLY CARD NO. 18

Improved Truck Power Unit

. . . no servicing underneath

This improved truck power unit opens like a book to ease servicing and maintenance on the manufacturer's entire line of electric



industrial trucks. All moving parts are housed behind hinged double doors. There is nothing to inspect or service under the unit, except wheels. One example: the complete turret drive assembly can be exchanged in 30 minutes.

All brushes are visible for fast inspection and replacement. Control switches, contactors and lubrication points are likewise located for fast servicing. Addition of a foot extension supplies extra operator space; leg guards are sponge rubber padded for comfort. Travel switch provides three separate speeds in both forward and reverse. Raymond Corp., Dept. ST, Greene, N. Y.

FOR MORE DATA—CIRCLE REPLY CARD NO. 19

Conveyor Roll Ball Bearing

. . operates on 1/3 less grade

Low-friction ball bearing, called X-series, is developed specifically for conveyor rolls. In these units, balls are separated with a one-piece retainer that requires no rivets to hold parts together. It is interchangeable with the old-type bearing and has same capacity.

With less friction, it is reported

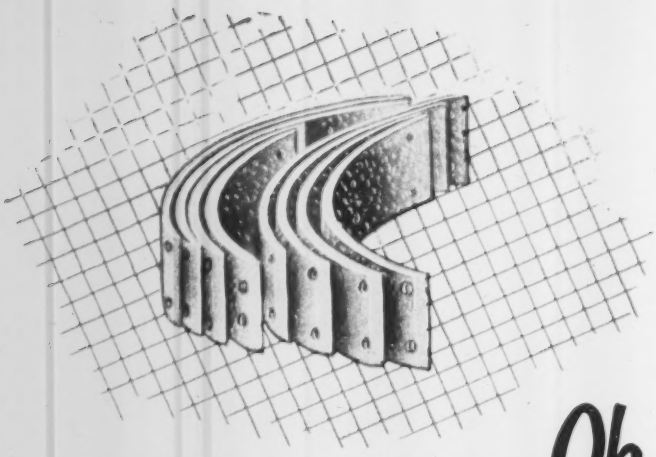
When high operating pressures call for ***strong welds . . .***

Arcos stainless electrodes can deliver top-performing weld metal for high-pressure jobs—as well as others—because the specific qualities needed are "built in" every electrode. Arcos makes many electrodes for all kinds of jobs—each requiring a different balance of physical, chemical, or metallurgical properties. But, no matter how varied the requirements, Arcos electrodes will meet every one—consistently—yielding in the flash of an arc the highest grade weld metal available today.

For more information about specific applications of Arcos quality-controlled stainless electrodes, send for booklet, "What Electrode Would You Use?"

ARCOS CORPORATION, 1500 South 50th Street, Philadelphia 43, Pennsylvania

WELD WITH ARCOS STAINLESS ELECTRODES



BETTER WIRE—BETTER BRAKE LINING? *Oh, YES!*

for Automobiles . . . Trucks . . . Motorcycles

Farm Implements . . . Hoists . . . Tractors

Earth Moving and other Industrial Machinery

REYNOLDS WIRE
protects performance

Who makes the brake lining? The answer is important to automotive, agricultural and other industrial users.

But who makes the wire cloth that reinforces the brake lining?

That, too, is important. To the makers of the brake lining. To those who build brake lining into their motor cars, trucks, buses, farm implements, contractors' and other kinds of machinery. And to the users of those machines.

Because the better the wire, the more dependable and the more uniformly effective the braking. And it prolongs the wear and adds to the service life of the lining.

There is no better reinforcing agent than Reynolds Wire Cloth—for all compounds, plastics, rubbers, and building materials.

For the automotive and all other "precise specification" industries, Reynolds is made to meet special requirements—by engineers with 50 years' specialized know-how, using the most modern equipment and methods. Consultation without obligation.

REYNOLDS WIRE DIVISION, NATIONAL-STANDARD CO.
DIXON, ILLINOIS

Divisions of National-Standard Co.

ATHENIA STEEL	*Clifton, N. J.*	Flat, High Carbon, Cold Rolled Spring Steel
NATIONAL-STANDARD	*Niles, Mich.*	Tire Wire, Fabricated Braids and Tape
WAGNER LITHO MACHINERY	*Jersey City, N. J.*	Metal Decorating Equipment
WORCESTER WIRE WORKS	*Worcester, Mass.*	Round and Shaped Steel Wire, Small Sizes

NS NATIONAL-STANDARD Company NILES, MICHIGAN

to operate by gravity on one-third less grade than the manufacturer's previous types. Logan Co., Dept. ST, Louisville, Ky.

FOR MORE DATA—CIRCLE REPLY CARD NO. 20

Air Cylinder Line

. . . built-in operating valve

Built-in operating valve is featured in this line of air cylinders. This type of cylinder eliminates one pipe connection usually required for a double-acting cylinder and is reported to increase efficiency by reducing line friction.

Integral valve is a universal

type, furnished so it can be operated by miniature poppets, direct or remote, or converted to single or double solenoid operation. Valve can be furnished with dual speed controls. A full line of two-way poppet valves for air-limit, hand or foot operation will be offered in addition to standard electrical conversion units. Carter Controls, Dept. ST, 2928 Bernice Rd., Lansing, Ill.

FOR MORE DATA—CIRCLE REPLY CARD NO. 21

Pencil Soldering Iron

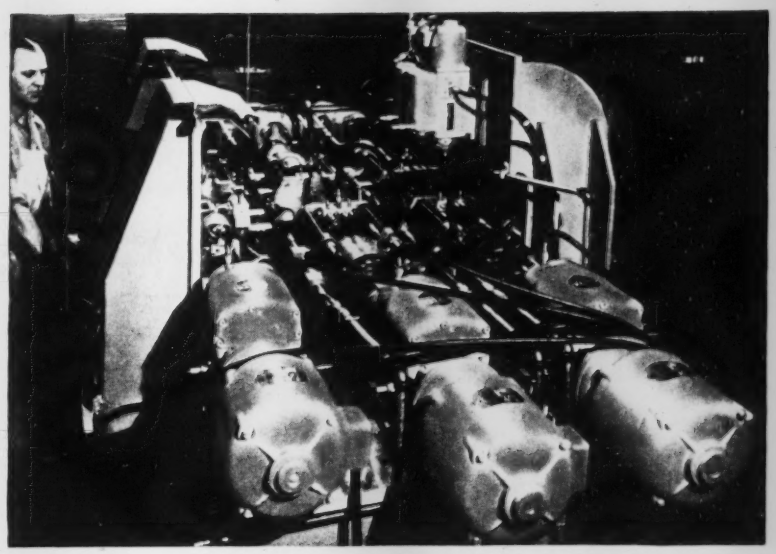
. . . tip, element are separate

This soldering iron combines advantages of a pencil iron and industrial soldering iron. It is built with nickel-chromium and mica wound mounted elements. Tip and

element are separate parts, both replaceable independently.

The unit is available in 25 w with 1/8-inch tip or 30 w with 3/16-inch tip. Hexacon Electric Co., Dept. ST, 139 W. Clay Ave., Roselle Park, N. J.

FOR MORE DATA—CIRCLE REPLY CARD NO. 22



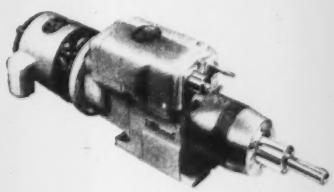
Machine Details
Dimensions: 10¾' long, 6½' wide, 7' high; weight about 16,000 lbs. 8 Delta drill units: 6 Model 19-400, 2 Model 19-150. 5 drill units equipped with multiple-spindle drill heads. Total HP—13.

Control Panel
Selector switches make possible any combination of 3 positions, 8 stations—a universal machine. Operator presses a starting button, sequence of operations is automatic, machine stops automatically when work is finished. 3000 feet of wiring between panel and machine.

When conventional tools required 25 minutes to complete 9 holes in a spirit-duplicator cylinder, A. B. Dick engineers built their own special horizontal drilling machine, using 8 Delta air powered hydraulic drill units, and now do the job in less than two minutes.

Their new machine drills, spot faces and reams 9 holes in aluminum cylinders—needs but a single operator, has automatic remote control.

Operation of this 3-position, 8-station machine consists of loading and pressing the starting button. The Delta drill units operate in four banks, in automatically controlled sequence of drilling, spot facing, milling and reaming. When the cycle is completed, the finished piece returns to original position and the machine stops. It is universal—handles any piece up to 12" diameter and 24" length.



DELTA QUALITY MAKES THE DIFFERENCE

From 25 minutes to 2 minutes
—that's the time saved by A.B.DICK CO.
with 8 DELTA AIR-POWERED HYDRAULIC DRILL UNITS

"This machine is so fast and so accurate," says Edward Brenn, design engineer, "that 3 or 4 days use per month is ample to keep up with production demand. The operator is free for other duties. We just didn't have the equipment to do this job economically—so we built the machine ourselves."

Three Delta air powered hydraulic drill unit models are now available to meet your specific requirements—1½", 4" or 6" stroke, No. 80 to 1" diameter drill. See your authorized Delta drill unit dealer—write for new catalog.

DELTA QUALITY MACHINE TOOLS
Another Product of **Rockwell**

Delta Drill Unit Division
Rockwell Manufacturing Company
638J N. Lexington Avenue,
Pittsburgh 8, Pa.

☐ Please send catalog AD 723.
☐ Send name of nearest authorized Delta drill unit dealer.

Name _____
Position _____
Company _____
Address _____
City _____ Zone _____ State _____

Aluminum is *Why*

you can do what you doodle

In an extruded shape, you can put the metal exactly where you want it.

Almost any cross-section you sketch can be duplicated in metal. Extrusion eliminates design compromises that are required when a part must be built up by riveting or welding, or machined out of solid metal . . . and saves production time.

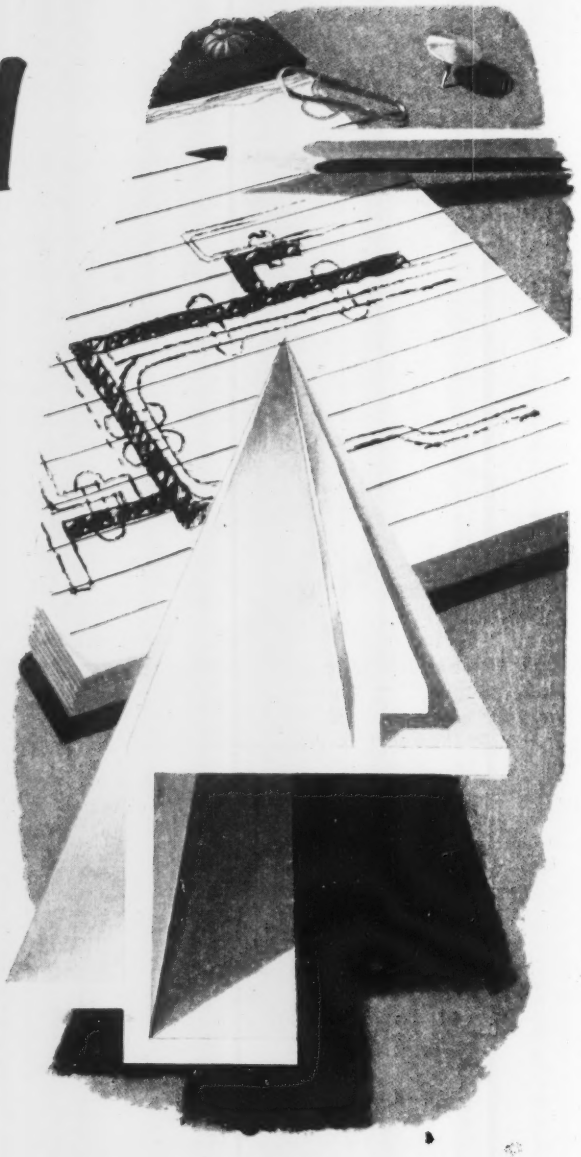
While extrusion is not a precision process, extruded shapes can be produced to fairly close tolerances. Lengths up to 80 feet or more are possible. Alcoa has a wide selection of standard extrusion alloys, from versatile 63S (excellent for architecture) to high-strength 75S (much used in aircraft).

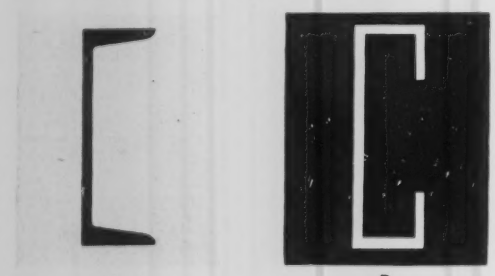
ALCOA is *How*

Alcoa is the world's largest light metal extrusion facility—operating plants in Lafayette, Ind.; New Kensington, Pa.; Cressona, Pa.; Vernon, Calif., and soon in Vancouver, Wash. Knowledge gained from 50 years in the extrusion business is available to help you use these efficient shapes. The output of 50 extrusion presses is available. Aluminum Company of America, 877-J Alcoa Building, Pittsburgh 19, Pa.

Alcoa Aluminum

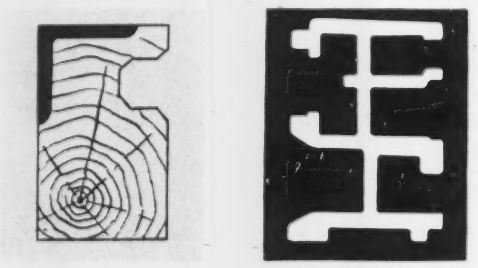
ALUMINUM COMPANY OF AMERICA





A B

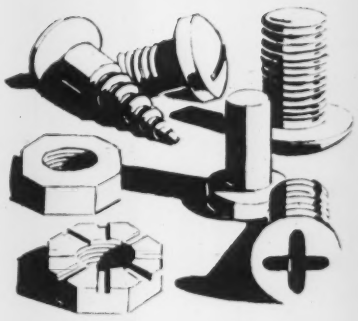
EXTRUDED CHANNEL B is designed to distribute the metal where it will resist column loads more effectively than Standard Channel A. As a result, it will support as a long column almost twice as much load as Channel A, though their weight is the same (2.91 pounds per foot).



C D

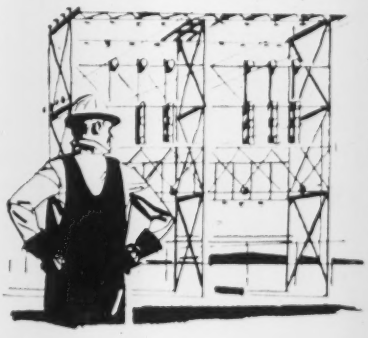
FIGURE C is a cross-section of a steel-reinforced wood beam used in a loom. It was desired that it be replaced with lightweight aluminum. Extrusion D offered the only method short of prohibitively expensive machining and required only surface finishing.

CORROSION-RESISTANT bearings of Alcoa® Aluminum lower diesel engine maintenance. They are solid metal all through.

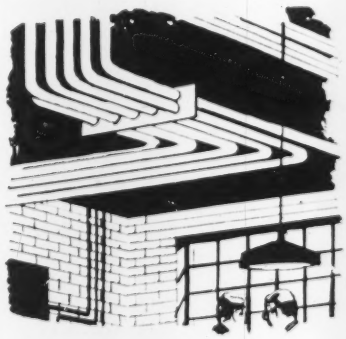


***FASTENERS** of aluminum are made by Alcoa in every commercial size and shape. A must with aluminum assemblies, they also dress up wood and plastic products.

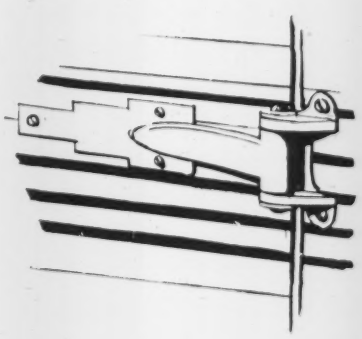
ALCOA ALUMINUM takes all finishes that other metals will take—plus gleaming, rust-resistant anodic coatings which are best on aluminum.



***ROLLED SHEAPES** available in Alcoa Aluminum include equal angles, unequal angles, channels, I-beams, H-beams, tees and zees.



***RIGID CONDUIT** of Alcoa Aluminum is the lowest cost corrosion-resistant metallic conduit available. Its nonmagnetic properties improve electrical efficiency—its light weight speeds installation.



ALCOA ALUMINUM FORGINGS meet the need in products that must be light in weight, high in strength. Alcoa forge shops are ready with expanded facilities and new production methods.

Products marked* are available from your local Alcoa Distributor listed here

ALABAMA
Birmingham
Hinkle Supply Co.

CALIFORNIA
Los Angeles
Ducommun Metals & Supply Co.
Pacific Metals Co., Ltd.
San Francisco
Pacific Metals Co., Ltd.

COLORADO
Denver
Metal Goods Corp.

CONNECTICUT
Milford
Edgcomb Steel of New England, Inc.

FLORIDA
Hialeah
Florida Metals, Inc.
Jacksonville
Florida Metals, Inc.
Tampa
Florida Metals, Inc.

GEORGIA
Atlanta
J. M. Tull Metal & Supply Co., Inc.

ILLINOIS
Chicago
Central Steel & Wire Co.
Steel Sales Corp.

LOUISIANA
New Orleans
Metal Goods Corp.

MARYLAND
Baltimore
Whitehead Metal Products Co., Inc.

MASSACHUSETTS
Boston
Edgcomb Steel of New England, Inc.
Cambridge
Whitehead Metal Products Co., Inc.

MICHIGAN
Detroit
Central Steel & Wire Co.
Steel Sales Corp.

MINNESOTA
Minneapolis
Steel Sales Co. of Minn.

MISSOURI
Kansas City
Metal Goods Corp.
St. Louis
Metal Goods Corp.

NEW JERSEY
Harrison
Whitehead Metal Products Co., Inc.

NEW YORK
Buffalo
Brace-Mueller-Huntley, Inc.
Whitehead Metal Products Co., Inc.
New York
Whitehead Metal Products Co., Inc.
Rochester
Brace-Mueller-Huntley, Inc.
Syracuse
Brace-Mueller-Huntley, Inc.
Whitehead Metal Products Co., Inc.

NORTH CAROLINA
Charlotte
Edgcomb Steel Co.

OHIO
Cincinnati
Williams & Co., Inc.
Cleveland
Williams & Co., Inc.
Columbus
Williams & Co., Inc.
Toledo
Williams & Co., Inc.

OKLAHOMA
Tulsa
Metal Goods Corp.

OREGON
Portland
Pacific Metal Co.

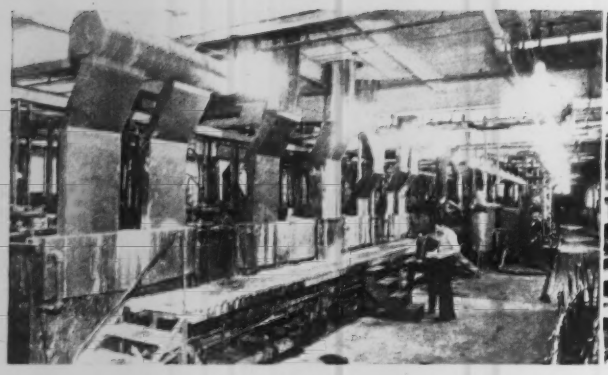
PENNSYLVANIA
Philadelphia
Edgcomb Steel Co.
Whitehead Metal Products Co., Inc.
Pittsburgh
Williams & Co., Inc.

TEXAS
Dallas
Metal Goods Corp.
Houston
Metal Goods Corp.

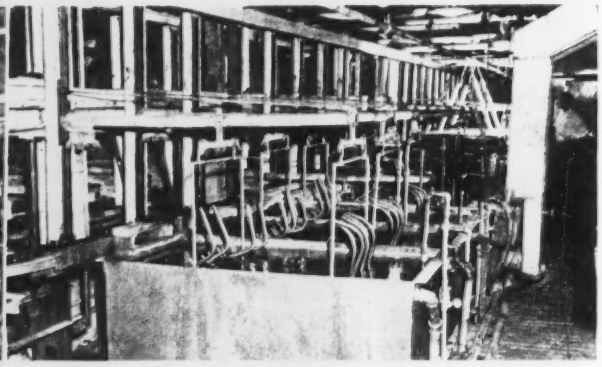
UTAH
Salt Lake City
Pacific Metals Co., Ltd.

WASHINGTON
Seattle
Pacific Metal Co.

WISCONSIN
Milwaukee
Central Steel and Wire Co.
Steel Sales Corp.



Copper plating line showing electrocleaning, spray rinse, cyanide dip, copper strike and copper plating tank. This line at Daystrom measures 142.5 feet long



After copper plating and rinse, furniture parts are given 50 millionths inch nickel coat. Follows another rinse and then a 30 millionths inch chromium finish

How One Plater Beat Nickel Shortage

After switching to copper during emergency, prominent company now says it probably won't go back to full nickel plating even after the governmental curbs are lifted

NICKEL plate was a widely used protective base for chrome-finished tubular furniture before the Korean war. Restrictions sent the industry scurrying for substitutes, and, as a stopgap measure, Daystrom Furniture, division of Daystrom Corp., Olean, N. Y., turned to copper. Today, the company's completely sold on the emergency metal.

"It's doubtful whether we'll go back to full nickel-plating," says M. E. Kilroy, head of quality control at Daystrom. "When the freeze eases, we'll probably put a nickel coating — maybe up to 0.0003-inch — on top of copper."

Company uses Wes-X PR bright copper plating process of the Hanson-Van Winkle-Munning Co., Matawan, N. J., which can turn out 100,000 lineal feet of tubing each day.

Balance Sheet — Daystrom has used PR processing on a continuous, 24-hour basis since the summer of 1951. Present coatings are: Copper, 0.00075 inch; chrome, 30 millionths inch; and nickel, 50 millionths inch, which is the maximum allowed.

Company says copper gives as good or better corrosion resistance as nickel. Over-all chemical costs are about the same. Copper is cheaper than nickel, but price of copper salts makes up the difference.

However, labor expenses were cut in half. In the nickel-chrome operation, two plating machines and a crew of eight men were required. Now, four men operate the 40,000-gallon, Hanson-designed machine, which is the second largest in the world.

Give and Take—Wes-X process operates on a periodic, reverse-current principle. It alternately plates and deplates a piece of work, to give it a smooth, shiny finish. Period current reversal shaves down microscopic hills and fills in valleys of copper. This leveling increases copper's resistance to corrosion.

Process, which operates under high current densities, deposits heavy coatings of copper in a short period. In making irregularly-shaped pieces of furniture, these high densities are needed. Some pieces have target distances to metal anodes that vary as much as 18 inches.

Changeover—Before curbs were legislated, Daystrom did nickel plating in one machine and chromium plating in a second. First thing engineers did was to combine copper and chromium operations in one machine.

Mechanical changes included installing more elevator stations and putting in steel heat exchangers.

Plating Circuit — Electroplating operation takes place on a 285-foot, racetrack-shaped plating line. Phases include: Loading racks with work to be plated; cleaning work prior to plating; plating with copper on homestretch; plating with nickel; plating with chromium; unloading finished parts; and, finally, cleaning and stripping racks on backstretch.

Except for loading and unloading, operation is automatic. Conveyor system carries work from station to station, a distance of 42 inches. Elevators dunk work into baths, which are 6 feet, 10 inches wide at each station.

Along the Line—Work passes through 8 stations before reaching the copper strike tank. Preceding stops include two electrocleaning tanks, spray tank, three rinse and spray tanks, acid dip tank and a cyanide dip tank.

Alkaline cleaner from the second electrocleaning tank (station No. 3) is pumped into the first electrocleaning tank (station No. 1) at end of each week. Solution from No. 1 is discarded each week.

In the cyanide dip tank, about 10 ounces of sodium cyanide per gallon of water is used. Bath neutralizes acid still clinging to parts, removes all traces of ferric salts and acts as an intermediate between water tank and copper strike tank.

Copper strike tank prepares parts for Wes-X dip and is necessary for good adhesion of copper to steel. Bath is about 80 per cent efficient.

Wes-X Bath—Process takes 23 station stops. Racks and work at first three and last two are cathodic. Others are alternately anodic and cathodic. Plating takes place at 100 amps per sq ft. Time is 13 minutes, 44 seconds at 180 to 190°F at pH of about 12. Latter controls amount of materials added to bath.

Constituents of bath in ounces per gallon are: Copper, 8.0; free potassium cyanide, 1.5; potassium hydroxide, 6.5-7; and potassium carbonate, 8.0.

Copper solution is filtered continuously. At Daystrom, two 7500 gph filters turn over solution in tank every hour. Bath air is agitated by 160-cfm, low-pressure blower operating at 5 psi.

Windup—Before the 42-second nickel strike (station No. 15) and chromium plating (station No. 17), work goes through a save-rinse tank, which is air agitated. Water is deionized in a 1000-gph unit; then air is bubbled through it to drive out carbon dioxide.

Water from reclaim tank is used as make-up water for plating tank. Because make-up water amounts to about 50,000 gallons each 24 hours, dragout loss is small.

Standard chromium-plating operation is used. Time is 3 minutes, 6 seconds. After rinsing, work goes into an alkali strip tank, which removes chrome plate at exposed contact points. Concentration of caustic soda used is 4 to 6 ounces per gallon in a cold solution.

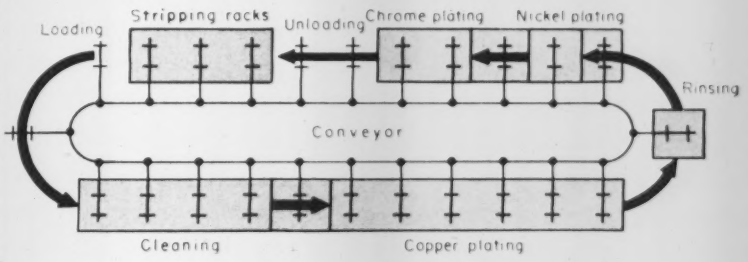
If chromium is not taken off at this point, it would later contaminate cleaning baths and plating solutions. After a cold rinse, muriatic acid dip is used to neutralize alkali. Last two stops on line are hot rinse and loading station.

Power — Six generators supply current used in cleaning and plating tanks. Three 7500-amp units provide current for 18 periodic reverse stations of Wes-X bath. Each generator services six stations.

A 10,000-amp unit supplies current for nickel and chrome plating operations. Two smaller generators are used for electrolytic alkaline cleaning and electrolytic acids, as well as five stations of Wes-X bath that are cathodic.

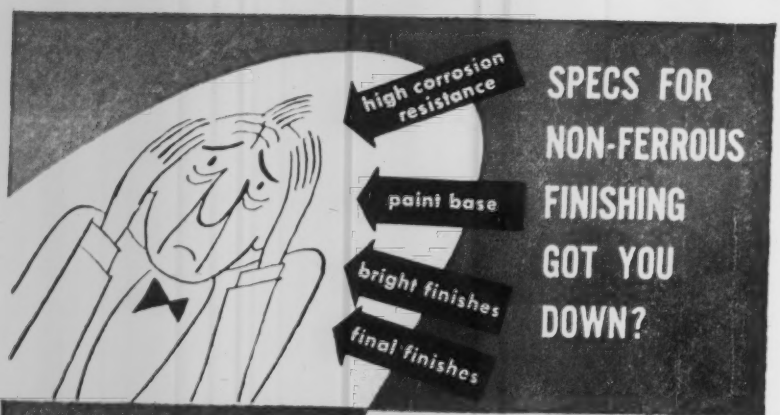
Conveyor—Conveyor has arms extending over solution tanks. They carry two racks on which chair frames, table legs and other pieces of work are quickly loaded and unloaded. Arms are mounted on rollers set in vertical guide channels. Channels are connected to upper and lower endless chains.

Crank arms lift and lower work-carrying arms. Chain drive and elevator lift are interlocked.



Stations Involved in Copper Plating Process

Station:	Conditions:
1. Electrocleaning tank	Alkaline cleaner; temperature, 180° F, dip time, 42 sec.
2. Spray tank	Room temperature, plain water, time 6 sec.
3. Electrocleaning tank	Same as No. 1
4. Rinse and spray tank	Time, 6 sec.
5. Rinse and spray tank	Time, 6 sec.
6. Acid dip tank	Sulphuric acid, time, 6 sec.
7. Rinse and spray	Time, 6 sec.
8. Cyanide dip tank	Concentration: About 10 oz/gal sodium cyanide
9. Copper strike tank	Temperature, 140 to 160°F, time, 42 sec.
10. Wes-X bath	Temperature, 180 to 190° F, pH about 12, time, 13 min., 44 sec.
11. Save rinse tank	Time, 6 sec.
12. Cold rinse	Time, 6 sec.
13. Acid dip tank	Time, 6 sec.
14. Cold rinse	Time, 6 sec.
15. Nickel strike	Time, 42 sec.
16. Cold rinse	Time, 6 sec.
17. Chromium plating tank	Standard operation, time, 3 min., 6 sec.
18. Reclaim rinse	Time, 6 sec.
19. Cold rinse	Time, 6 sec.
20. Cold rinse	Time, 6 sec.
21. Cold rinse	Time, 6 sec.
22. Hot rinse	Time, 6 sec.
23. Unload	Racks are left on carrier arms, time, 3 min., 6 sec.
24. Alkali dip tank	Cold solution of caustic soda, 4 to 6 oz/gal, time, 1 min., 54 sec.
25. Cold rinse	Time, 6 sec.
26. Muriatic acid dip	Time, 6 sec.
27. Hot rinse	Time, 6 sec.
28. Loading station	Time, 3 min., 6 sec.



FIND OUT ABOUT **IRIDITE** TODAY for finishing ZINC, CADMIUM, ALUMINUM, CUPROUS METALS

WANT CORROSION RESISTANCE? Iridite will give you better-than-specification protection against corrosion.

WANT PAINT ADHERENCE? Iridite provides a firm and lasting base for paint by preventing under-film corrosion.

WANT EYE-APPEAL? Iridite can give you a variety of finishes, depending upon the metal being finished . . . from clear and sparkling bright or military olive drab, to attractive dyed colors.

BEST OF ALL, any Iridite finish is economical and easy to apply.

for example: **IRIDITE** (AL-COAT) REDUCES NEED FOR ANODIZING

Simple chemical dip; immersion time only 10 seconds to 2 minutes; no sealing dip; color is clear or yellow depending upon your requirements; salt spray resistance equivalent to 20 to 30 minutes of anodizing, eliminates need for costly racks and electrical power.

WANT TO KNOW MORE? Write for literature and send production samples for free test processing. See "Plating Supplies" in your classified telephone directory or write direct.

Iridite is approved under government specifications.

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CALENDAR
OF MEETINGS

September 20-23, National Metal Trades Association: Eastern plant management conference, Sagamore hotel, Lake George, N. Y. Association address: 122 S. Michigan Ave., Chicago 3. Commissioner: Charles L. Blatchford.

September 20-23, Packaging Machinery Manufacturers Institute: Annual meeting, Skytop Lodge, Skytop, Pa. Institute address: 342 Madison Ave., New York 17. Secretary-treasurer: Helen L. Stratton.

September 20-23, American Institute of Wholesale Plumbing & Heating Supply Associations Inc.: Annual convention, Hotel Waldorf-Astoria, New York. Institute address: 402 Albee Bldg., Washington. Executive secretary: George T. Underwood.

September 21, Cutting Tool Manufacturers Association: Fall meeting, Lochmoor Club, Detroit. Association address: 416 Penobscot Bldg., Detroit 26. Secretary: M. J. Ewald.

September 21-22, Steel Founders' Society of America: Fall meeting, The Homestead, Hot Springs, Va. Society address: 920 Midland Bldg., Cleveland. Secretary: F. Kermit Donaldson.

September 21-23, Truck Body & Equipment Association Inc.: Annual meeting, Sheraton-Gibson hotel, Cincinnati. Association address: 1122 DuPont Circle Bldg., Washington 6. Executive manager: Arthur J. Nuesse.

September 21-24, American Mining Congress: Annual metal and nonmetallic mineral mining convention, Olympic hotel, Seattle. Congress address: 1102 Ring Bldg., Washington 6. Executive vice president: Julian D. Conover.

September 21-25, Instrument Society of America: National instrument conference and exhibit, Hotels Morrison and Sherman, Chicago. Society address: 1319 Allegheny Ave., Pittsburgh. Manager: P. V. Jones Jr.

September 22, Tungsten Institute: Annual meeting, Olympic hotel, Seattle. Tungsten Institute information service: 1757 K St., NW Washington 6. Executive secretary: James A. White.

September 23-25, National Industrial Conference Board Inc.: General session for all associates on marketing, Hotel Waldorf-Astoria, New York. Board address: 247 Park Ave., New York 17. Secretary: Herbert S. Briggs.

September 23-26, National Association of Foremen: Annual convention, Milwaukee. Association address: 321 W. 1st St., Dayton 2, O.

September 24-27, American Refractories Institute: Fall meeting, Broadmoor hotel, Colorado Springs, Colo. Institute address: 1872 Railway Exchange Bldg., St. Louis 1. President: W. J. Westphalen.

September 25, Malleable Founders' Society: General meeting, Hotel Cleveland, Cleveland. Society address: 1800 Union Commerce Bldg., Cleveland 14. Managing director: Lowell D. Ryan.

September 28-30, American Management Association: Personnel conference, Hotel Statler, New York. Association address: 330 W. 42nd St., New York 36. President: Lawrence A. Appley.

September 28-30, National Electronics Conference Inc.: Annual conference and exhibition, Hotel Sherman, Chicago. Conference address: 852 E. 83rd St., Chicago. Executive secretary: Karl Kramer.

September 28-October 1, Association of Iron & Steel Engineers: Annual meeting, Hotel William Penn, Pittsburgh. Association address: 1010 Empire Bldg., Pittsburgh. Managing director: T. J. Ess.

September 29-October 3, Society of Automotive Engineers Inc.: National aeronautics meeting, aircraft engineering display and aircraft production forum, Hotel Statler, Los Angeles. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

September 30-October 2, Porcelain Enamel Institute: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Institute ad-

*REO DESIGN ENGINEERS SAID...

TOUGH JOB?

WE'LL SPECIFY

STRESSPROOF®

SEVERELY COLD-WORKED, FURNACE-TREATED STEEL BARS

AGAIN!

Reo Motors, Lansing, Mich., have again specified STRESSPROOF—this time for the power shaft on their new rotary lawn mower.

Another Reo Lawn Mower to Use STRESSPROOF

Reo engineers needed *top performance* from this new drive shaft . . . so they insisted on STRESSPROOF! They knew from years of successful experience with STRESSPROOF that it could take abuse. It had both the strength and wearability to stand up under the toughest service—and its excellent machinability was most welcome from a cost standpoint.

The alternative to STRESSPROOF would have been a heat-treated part, with the attendant cleaning, straightening, and machining problems.

Only STRESSPROOF gives you a unique combination of four qualities *in-the-bar*: Strength, Wearability, Machinability, and Minimum Warpage. Yet it costs less than the other quality cold-finished steel bars.

STRESSPROOF makes a better part at lower cost! It is available in cold-drawn or ground and polished finish.

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Free Engineering Bulletin
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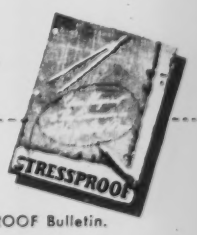

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Manufacturers of the Most Complete Line of Carbon and Alloy Cold-Finished and Ground and Polished Steel Bars in America.

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1414 150th Street
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reconditioning any part

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AIRLESS BLAST CLEANING

A Finnell floor maintenance machine prior to reconditioning.

90% saving in labor costs

88% faster cleaning

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In reconditioning floor maintenance machines a Wheelabrator cut cleaning time from 8 hours to less than 1 hour per machine at Finnell System, Inc.

Only 5 minutes were required to clean these parts with the Wheelabrator.

Reconditioning of metal parts is a big and profitable business. It can be made more profitable when the airless Wheelabrator is used for removing surface corrosion such as rust, dirt, old chipped paint, etc. A quantity of parts requiring several hours to clean by costly, laborious methods can be restored to original surface cleanliness in minutes with the Wheelabrator blast cleaning process. Its rapid and thorough low-cost cleaning creates new profit possibilities in the reconditioning of trade-ins and leased machinery, auto parts, electrical equipment, pipe, structural steel, gas cylinders, etc.

Wheelabrator equipment is an investment with a quick return. Write for details for your reconditioning problem.

Catalog 74-B tells "What the Wheelabrator Is and What It Will do for you." Send for a copy today.

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WORLD'S LARGEST BUILDERS OF AIRLESS BLAST CLEANING EQUIPMENT

dress: 1346 Connecticut Ave., NW., Washington 6. Secretary: John C. Oliver.

September 30-October 3, National Association of Aluminum Distributors: Annual meeting, Broadmoor hotel, Colorado Springs, Colo. Association address: 1900 Arch St., Philadelphia 3. Secretary: R. Bruce Wall.

October 1, American Iron & Steel Institute: Youngstown regional technical meeting, Hotel Pick-Ohio, Youngstown. Institute address: 350 Fifth Ave., New York 1. Secretary: George S. Rose.

October 5-7, American Society of Mechanical Engineers: Fall meeting, Hotel Sheraton, Rochester, N. Y. Society address: 29 W. 39th St., New York 18. Secretary: C. E. Davies.

October 6-7, National Fluid Power Association: Fall meeting, Sheraton hotel, Chicago. Association address: 1618 Orrington Ave., Evanston, Ill. Executive secretary: Barrett Rogers.

October 6-8, American Institute of Electrical Engineers: Conference on application of motors to air-moving equipment and symposium on induction motors, Hotel Van Orman, Ft. Wayne, Ind. Institute address: 33 W. 39th St., New York 18. Secretary: H. H. Henline.

October 6-8, Electric League of Western Pennsylvania: Industrial electric exposition, William Penn hotel, Pittsburgh. Publicity chairman: F. B. Mahon, Duquesne Light Co., Pittsburgh.

October 7-9, National Association of Corrosion Engineers: South-central regional meeting, Mayo hotel, Tulsa, Okla. Association address: 1061 M & M Bldg., Houston 2. Executive secretary: A. B. Campbell.

October 7-10, Pressed Metal Institute: Annual meeting, Bellevue-Stratford hotel, Philadelphia. Institute address: 2860 E. 130th St., Cleveland 20. Managing director: Orrin B. Wernz.

October 8, American Iron & Steel Institute: Chicago regional technical meeting, Palmer House, Chicago. Institute address: 350 Fifth Ave., New York 1. Secretary: George S. Rose.

October 8-9, Rail Steel Bar Association: Fall meeting, Hotel Sheraton, St. Louis. Association address: 38 S. Dearborn St., Chicago 3. Secretary: W. H. Jacobs.

October 8-9, American Society For Quality Control Inc.: Midwest conference, Masonic Temple, Davenport, Iowa. Society address: 70 E. 45th St., New York 17. Secretary: Edward B. Haden.

October 8-9, National Conference on Industrial Hydraulics: Sheraton hotel, Chicago. Conference secretary: John G. Duba, Illinois Institute of Technology, 35 W. 33rd St., Technology Center, Chicago 16.

October 8-9, Gray Iron Founders Society Inc.: Annual meeting, Hotel Jefferson, St. Louis. Society address: 210 National City-E. 6th St. Bldg., Cleveland. Executive vice president: Donald H. Workman.

October 11-15, Chamber of Commerce of the United States: Better business relations conference, Hotel Gearhart, Gearhart, Oreg. Chamber of Commerce address: 1615 H St., NW, Washington.

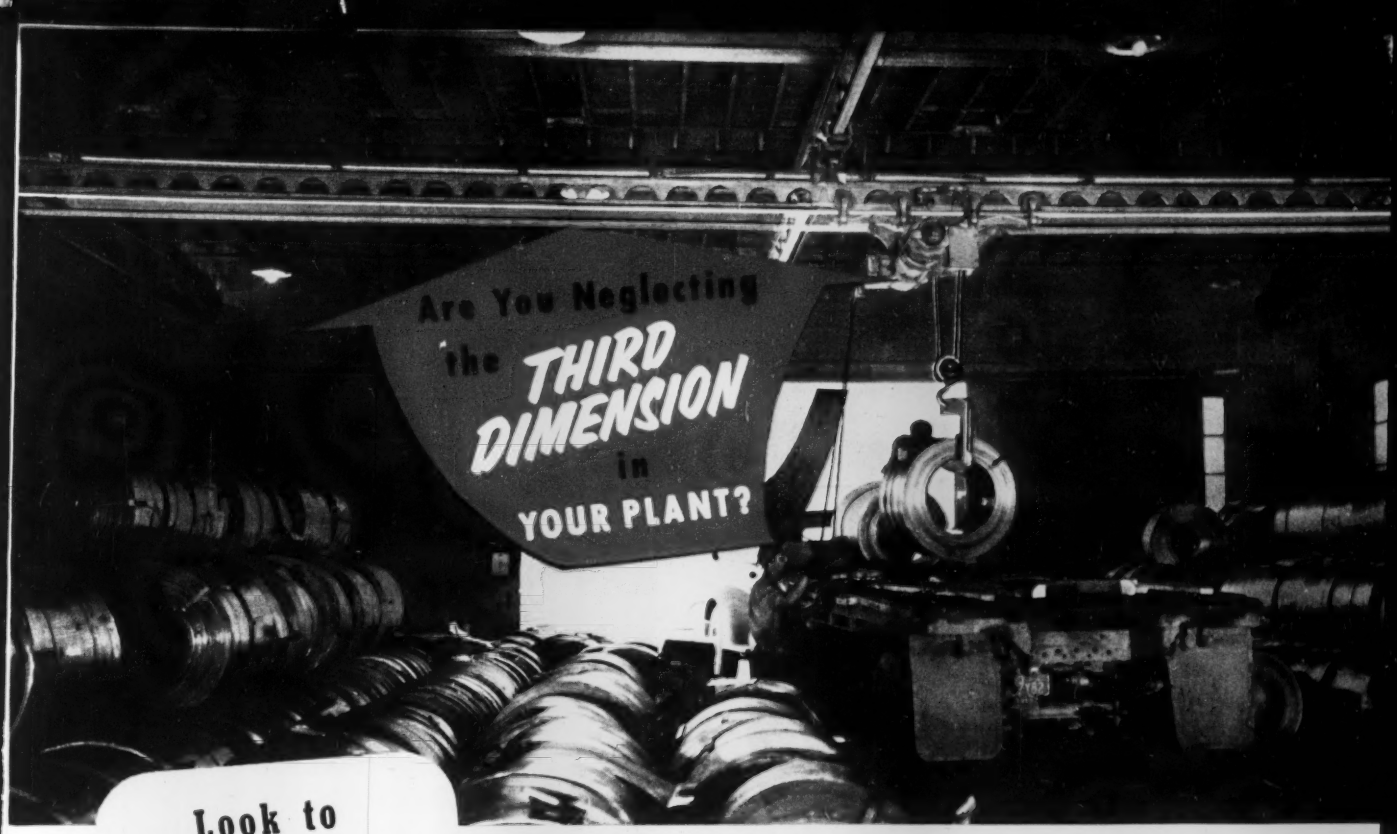
October 12-13, American Coke & Coal Chemicals Institute: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Institute address: 711-14th St., NW, Washington 5. Executive secretary: Samuel Weiss.

October 12-14, Packaging Institute: Annual meeting, Hotel Statler, New York. Institute address: 342 Madison Ave., New York 17. Executive director: Lawrence V. Burton.

October 12-14, National Association of Sheet Metal Distributors and American Hardware Manufacturers Association: Joint convention, Marlborough-Blenheim hotel, Atlantic City. Information: Thomas A. Fernley Jr., 1900 Arch St., Philadelphia 3.

October 12-17, Concrete Reinforcing Steel Institute: Semi-annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Institute address: 38 S. Dearborn St., Chicago 3. Managing director: H. C. Delzell.

October 13, Steel Joist Institute: Semi-annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Institute address: Dupont Circle Bldg., Washington 6. Managing director: C. H. Luedeman.



Look to the Ceiling for the *Practical Way* to Gain WORKING AREA

IF you are neglecting the third dimension—i.e., height—in your plant, you may be wasting a vast amount of space that could increase your productiveness or storage capacity up to 100%.

Modern practice goes beyond length and width measurements for maximum effective use of a building. Consideration must be given to more than floor area. Today's production planners think in terms of a building's cubical size.

Every effort is made to remove all equipment and activities possible from the floor; thus, in effect add valuable extra footage to a building. Transferring of materials—movement from floor conveyances to overhead equipment is an outstanding example of this because the resultant savings are usually startling.

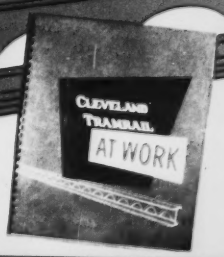
With thousands of installations in operation, our engineers are well experienced in overhead materials handling and will be glad to study how working area can be gained in your plant.

Investigate the Possibilities of

CLEVELAND TRAMRAIL

... the Overhead Track to *Lower Production Costs*

Let us mail you this booklet. Packed with helpful data. Ask for No. 2008.



This large book is the greatest in its field. Contains a wealth of valuable information. Covers details of 91 outstanding installations. Has 252 large photos, 38 system layouts, 59 other sketches. Write for "Cleveland Tramrail at Work." A

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
7896 EAST 284th ST. **WICKLIFFE, OHIO**

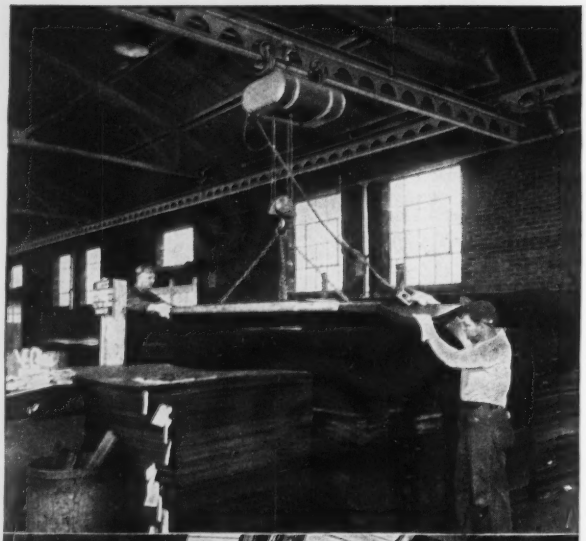
CUTS SHEET HANDLING TIME 37½%—Time for handling 70,000-lb. loads of sheet steel from car to storage was reduced from 32 to 20 man-hours—a 37½% saving—by installation of an inexpensive Cleveland Tramrail system.

THE *Penalty* OF NOT HAVING OVERHEAD HANDLING IS

Far Greater than the Cost of Installing it!

The Installation of a Cleveland Tramrail System Resulted in Amazing Savings in Time, Money and Effort for these Companies.

BECAUSE the savings and many other advantages that Cleveland Tramrail equipment offer are so great, many plants, without realizing it, are heavily penalized for not having overhead handling equipment. The fact that most Cleveland Tramrail installations pay for themselves in a year makes this obvious. Every year thereafter the savings continue, *to help profits or competitive position.*

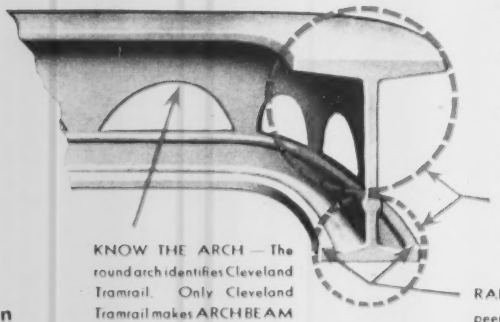


SAVES 2 HOURS TRUCK TIME ON EVERY LOAD —In only 5 minutes this truck is loaded with a Tramrail hoist-carrier and ready to go. The lumber, weighing 8,000 lbs., is pre-assembled and handled as a single package. Two hours is saved on each load. This permits more trips per truck and faster deliveries.

Check Your Handling Needs with Your CLEVELAND TRAMRAIL Distributor

Cleveland Tramrail Distributors in 55 principal cities in U. S. A. and Canada are fully equipped to serve you. Through experience and training, their engineers have the "know-how" to work out the best solution to your materials handling problem.

Here are 2 Reasons Why CLEVELAND TRAMRAIL Systems are doing a Number 1 Job in Hundreds of Plants



KNOW THE ARCH — The round arch identifies Cleveland Tramrail. Only Cleveland Tramrail makes ARCH BEAM with true round arches. No other beam has the important feature of ARCH BEAM — raised wearing treads.

1. THE FAMOUS ARCH BEAM

SEVEN SIZES—Seven sizes (8" to 18" deep), all with same rail width, enabling carriers to travel between any pair of beams.

REDUCES WEIGHT—Arches reduce weight and help room lighting without sacrifice of strength.

COMPOUND SECTION—Made of two parts. Wide flanged mild steel beam welded to high-carbon Tramrail track with Brinell hardness of 225.

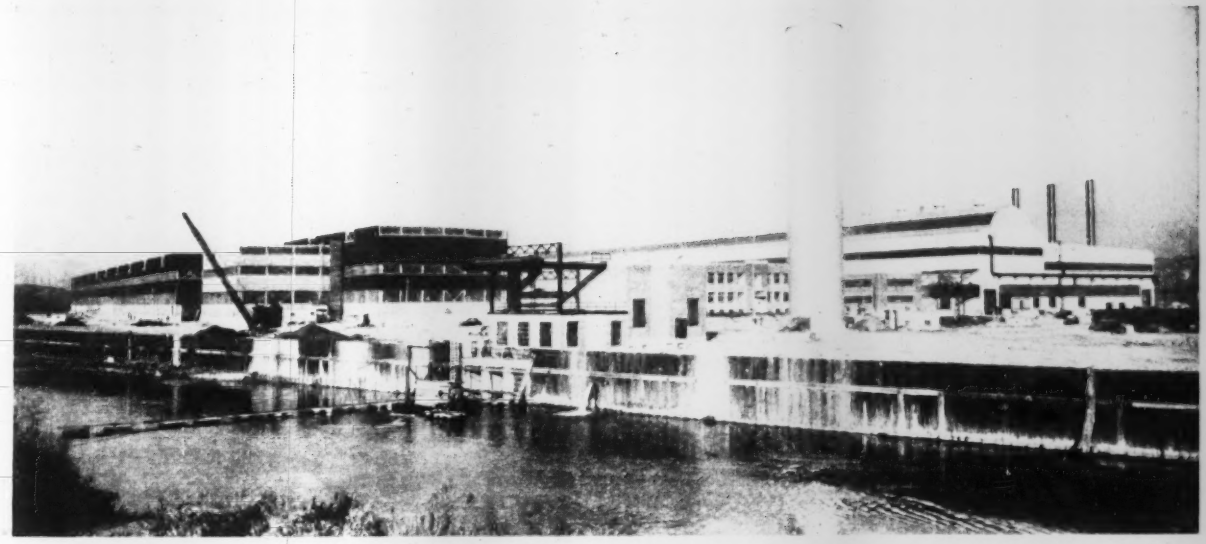
RAISED WEARING TREADS—Raised treads prevent peening and provide wear factor not obtainable with any other single-piece track. No separately mounted rails or wear treads to loosen and require maintenance.

2. FORGED STEEL WHEELS

Wheels are drop forged steel with heat treated and hardened tread and flanges, having 425 Brinell hardness. Equipped with double-race type ball bearings. Wheels bear square on track. Permit easy swiveling on curves. Minimize propelling energy required.

MODERN TRAMRAIL WHEEL AND TRACK DESIGN

CLEVELAND TRAMRAIL DIVISION The CLEVELAND CRANE & ENGINEERING CO., Wickliffe, Ohio



Water Treatment for Corrosion Control

Iron and steel water systems can be protected by two methods. One involves removal or neutralization of factors favoring corrosion; the other reinforces inhibitors

By G. B. HATCH
President
Calgon Inc.
Pittsburgh

CONTROL of under-water corrosion in iron and steel water systems is generally easier than predicting the apparent corrosivity of a given water supply.

Of course, factors that favor or inhibit corrosion are well known, but how they cancel out is not sufficiently understood. Desired balance is set up by treatment.

Two methods of treatment are available: 1. Water constituents known to be responsible for corrosion can be removed or neutralized. 2. Known corrosion inhibiting factors can be reinforced. First method decreases corrosivity of the water; second makes the metal more resistant to corrosion by the formation of protective films on its surfaces.

No. 1 Enemy — Primary cause for corrosion in most water systems is dissolved oxygen. It's removed by mechanical or chemical de-aeration methods.

Both methods are employed in the treatment of boiler feedwater by using sulfite to remove last traces of dissolved oxygen in effluent from the de-aerating heater. De-aeration also has been utilized in certain closed cooling systems, although relatively few are adequately sealed against atmosphere to make the control practical. De-aeration is rarely used for distribution and transmission mains, chiefly because of economic considerations.

Use of ammonia or volatile amines for the protection of condensate return lines is an example of materials which neutralize the corrosive constituent. Corrosive agent to be neutralized is free carbon dioxide resulting from decomposition of carbonates in boiler water.

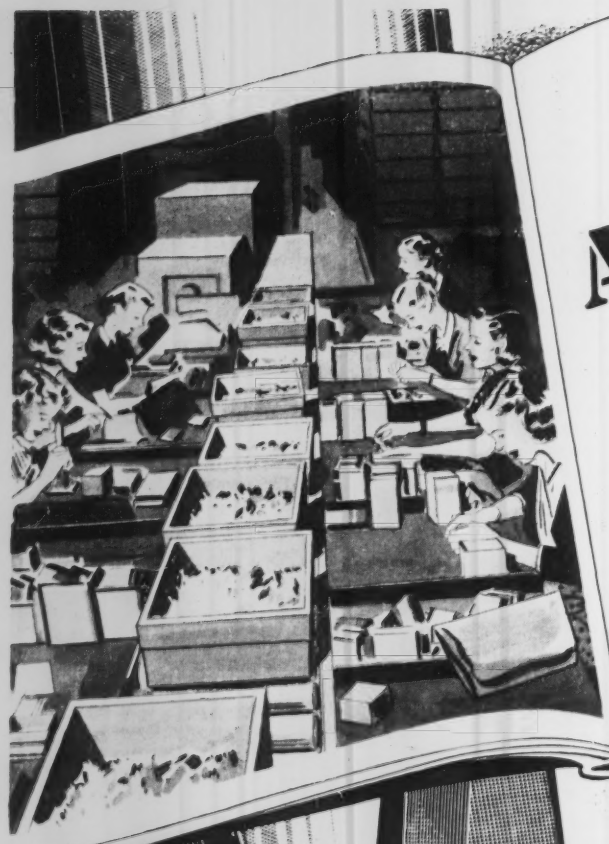
Return Lines — Attack in condensate return lines is often localized. It may be severe in spots and practically nonexistent in others. Often severe grooving of the portion of the pipe in contact with the condensate may result.

Type of attack results from localization of areas where carbon dioxide is concentrated in the condensate. Much of the carbon dioxide will tend to stay in the vapor phase unless condensation is extensive, as in traps and lines used for injection heating.

Certain of the amines, cyclohexylamine and morpholine for example, have the advantage over ammonia for use in condensate returns. They do not attack copper if treatment rate becomes excessive. In general, neither ammonia nor these amines is particularly effective when oxygen leakage into the return lines is high.

Bacteria — Chlorine and other bactericides can function somewhat indirectly for the neutralization of a corrosive constituent. They are often used to kill sulfate reducing bacteria that produce corrosive hydrogen sulfide.

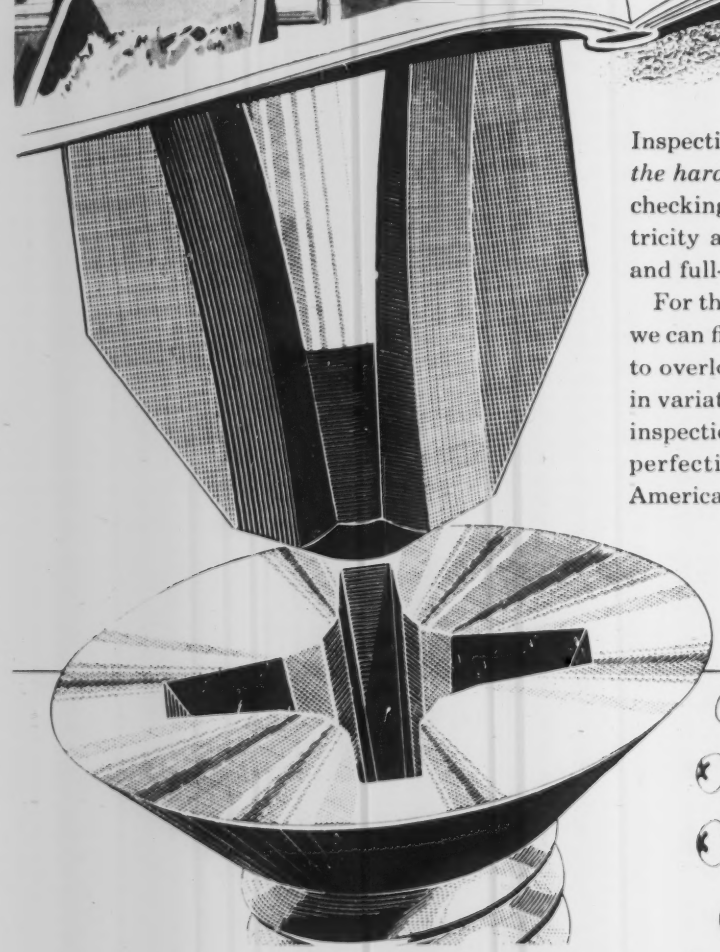
These bacteria produce hydrogen sulfide under anaerobic conditions. However, they still may cause trouble in an oxygen-bearing water. Accumulations of corrosion products or other debris upon



THE AMERICAN STORY

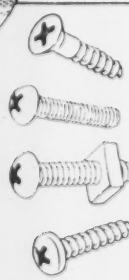
CHAPTER 13

Here there's no patience with "Bad Luck"



Inspection of screws can only be done one way . . . *the hard way.* And this means close and constant checking for depth and fit of recess . . . for concentricity and appearance of head . . . and for clean and full-formed threads.

For this work, we train the most intelligent eyes we can find. *And we train them not to blink* . . . not to overlook even the slightest touch of "bad luck" in variation from the letter of the law of American inspection procedures. That's why you get a higher perfection-percentage in every shipment of American Phillips Screws. Write:

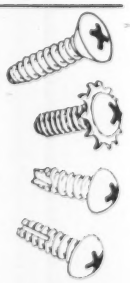


AMERICAN SCREW COMPANY

PHILLIPS HEADquarters

WILLIMANTIC, CONNECTICUT

Main Office & Plant
Willimantic, Conn.
Office & Plant, Norristown, Pa.
Office & Warehouse, Chicago, Ill.



areas of the metal surface may shield them sufficiently to produce local anaerobic conditions. Sulfate reducing bacteria then can produce hydrogen sulfide in such areas.

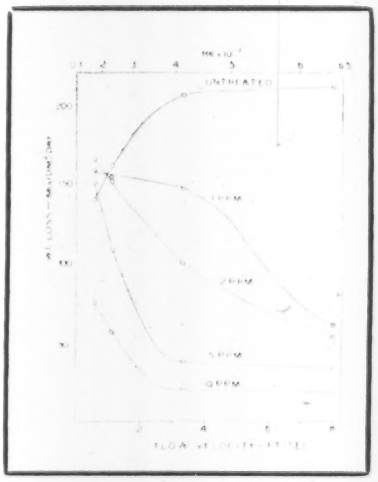
Inhibitors — More widely used types of inhibitors do not affect the actual corrosivity of the water to an appreciable extent. They increase resistance of the metal surface to attack. Water serves solely as a convenient means for the supply of these inhibitors to the metal surfaces.

Rate of formation of protective films upon metal surfaces is dependent largely upon the rate of supply of the inhibitor to these surfaces. Distribution may be by diffusion or by movement of the liquid relative to the solid surface.

Diffusion as a rate controlling factor is slow, particularly if distance to be covered is at all appreciable. Much more rapid means can be provided mechanically, as by agitation or flow of the liquid.

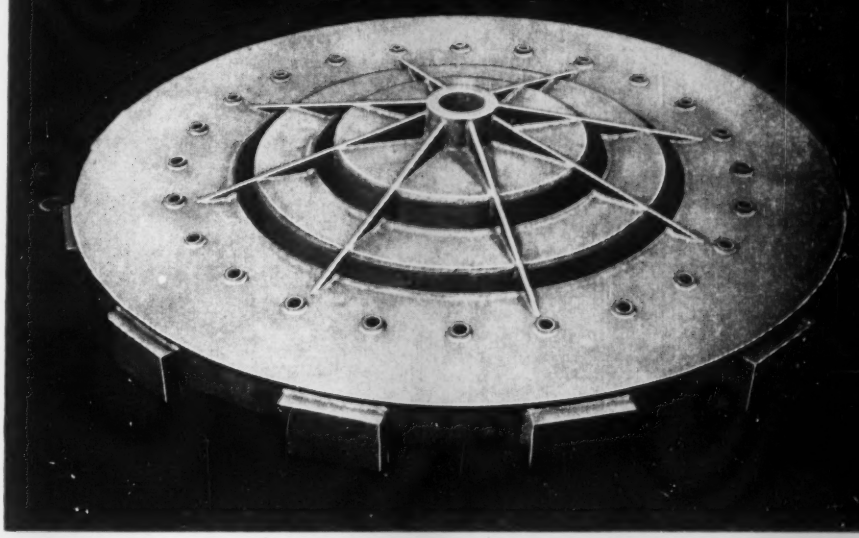
Coating Conditions — Type of flow in a system also has an important bearing upon supply of inhibitor to metal surfaces. Under strictly viscous or streamline flow conditions, little of the liquid actually contacts the pipe wall. Under turbulent flow conditions, a major portion of the liquid comes into intimate contact with metal surfaces.

Type and velocity of flow are



Curves show effect of increased velocity on steel tube corrosion rate, using treated and untreated tap water. Inhibitor used was a glassy phosphate

use castings?



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Acme weldments are replacing castings for leading machinery and equipment manufacturers everywhere because they do a better job at lower cost. Experienced Acme engineers at work with Acme's complete fabrication facilities can give *you* these same advantages . . . Acme's new 24-page, illustrated booklet shows you why. *The Facts about Weldments and Castings* tells you what you should know about their relative strength, rigidity, vibration, design flexibility, and cost . . . facts to help you specify and save. And it's yours for the asking . .

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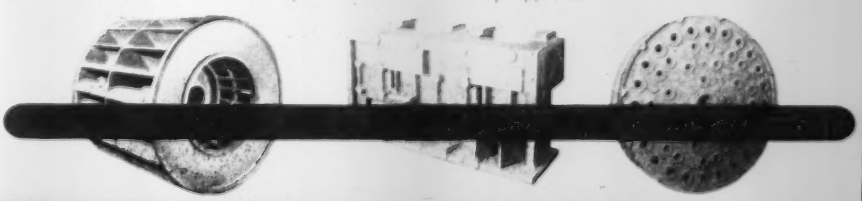


Are you assembling 1953 models with Socket Set Screws of 1930 design ?

Take a look at the Socket Set Screws in many 1953 models of machine tools, plant apparatus, appliances, etc., and you'll find they are no different from those used in 1930 or before.

If you think there has been no change in such fasteners since 1930, you haven't seen Parker-Kalon *Ground Thread* Socket Set Screws.

Their clean, smooth, shining threads assure easy keying, and faster assembly. But equally important is the design prestige P-K Ground Thread Socket Set Screws give any product. Any buyer associates modern engineering and top-most quality with a gleaming thread finish he has seen before only on costly set screws of instrument precision.

Compare them with any cut-thread socket set screws and you'll see the day-and-night difference. Then specify "P-K *Ground Thread*" on your next order. Put your product out in front, assembly-wise and sales-wise.

For SAMPLES, ask your P-K Distributor, or write: Parker-Kalon Corporation, 200 Varick St., New York 14.

Good judgment calls for

1953

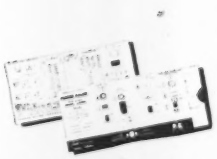
Ground Thread

PARKER-KALON®

when good design calls for

SOCKET SCREWS

The INDUSTRIAL DISTRIBUTOR steers your Supply Dollars to the best values.



SOCKET SCREW DIMENSION FINDER

Helps you plan assemblies. Pocket-size plastic chart gives essential dimensions of all types of P-K Socket Screws. Includes Set Screw Point Dimensions, and Thread Length Formula. Available FREE from your P-K Distributor.

If you want "Thru-the-Air" handling at its low-cost best, you can't beat this — a *genuine* P&H Zip-Lift Electric Hoist with rope control . . . only $199.50.

This new "Zip" is built to give you years of trouble-free service — *guaranteed* to withstand an occasional overload up to 25% more than the rated capacity. Other important advantages include real wire rope hoisting for wider side pull, double brakes for double safety, and easy installation (just hang it up and plug it in).

Yes, here's the number-one buy in the low-cost hoist field — the new Zip-Lift ready to save time and money for you. Check the many ways "Thru-the-Air" handling can cut your *costs*. Ask your nearby P&H Dealer to give your plant the once-over. His advice will cost you nothing — and he will save you money. Call him today!

Also available with full-magnetic push button control

handle it "THRU THE AIR" with

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HARNISCHFEGER CORP. MILWAUKEE WIS.

P&H
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HARNISCHFEGER CORPORATION
MILWAUKEE 46, WISCONSIN

the [redacted] *Line*

TRUCK CRANES · DIESEL ENGINES · POWER SHOVELS · PREFABRICATED HOMES · ELECTRIC HOISTS · SOIL STABILIZERS · WELDING EQUIPMENT · OVERHEAD CRANES

important even in the absence of inhibitors. They govern rate of supply of dissolved oxygen to the metal surface. General effect of increased velocity in an untreated system is to increase the corrosion rate, since oxygen is supplied more rapidly to the surfaces.

In certain less corrosive waters, the corrosion rate with untreated water will rise initially as the flow velocity increases. Then it will decrease. This decrease at higher velocities is a manifestation of the familiar dual role of oxygen in corrosion. At higher rates of flow, dissolved oxygen is supplied to the surface fast enough to maintain a protective oxide film.

Presence of bacteria, slimes and algae in a water system can interfere with protective film formation even though they release no specific corrosive constituents. They may accumulate on a surface and greatly hinder its access by inhibitors.

Condensate Films — Inhibitors which function by the formation of protective films upon metal surfaces also have been used for condensate return lines. Chief compounds used are amines. They are sufficiently volatile to pass over with steam when fed to the boiler. However, their action is different from that of the neutralization-type amines.

Film-forming amines are of the long-chain, high-molecular-weight type such as octadecylamine. In concentrations used (about 2 ppm), they neutralize little of the carbon dioxide present. Films they deposit upon metal surfaces provide protection against both carbon dioxide and moderate concentrations of oxygen. Protection against oxygen attack is considerably more pronounced than results gained from simple elevation of pH.

Closed Systems — Term closed system is used rather loosely to designate cooling systems with practically no loss by evaporation. Relatively few are closed to air, and de-aeration is rarely practical.

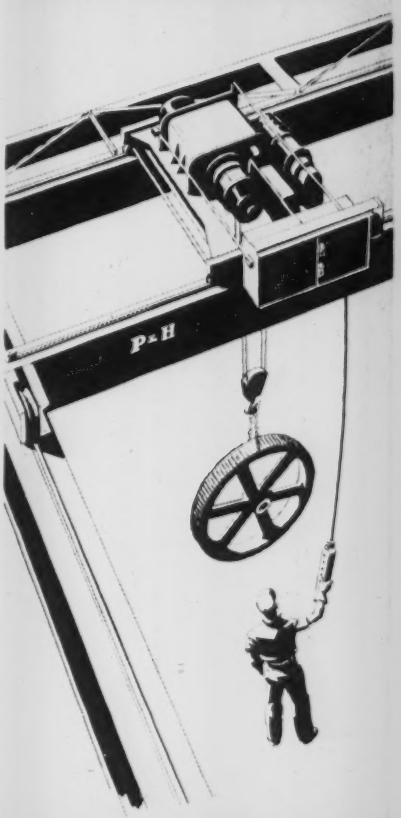
One of the more common examples of the closed type is the diesel cooling system. Wide variety of metals encountered, such as steel, aluminum, copper and its alloys and solder, present a challenging corrosion problem.

Chromate at a concentration of about 2000 ppm and pH of 6.5 to 9.5 has been used extensively with satisfactory results. Chief drawback to its use in diesel cooling systems is its toxicity. Disposal problem is posed if leakage is higher, and proper handling is required to avoid possible dermatitis.

Recirculating Systems — Corrosive conditions in open recirculating cooling systems generally are quite severe. Water is well aerated. Dissolved oxygen content closely reaches saturation. Rather high contents of dissolved salts may be reached as the water in the system concentrates. However, this is amenable to control by blowdown.

Circulating water also is sub-

P&H



Water treated with slowly soluble phosphate glass flowed through pipe at left for 10 months. Section at right was exposed to untreated water for four months

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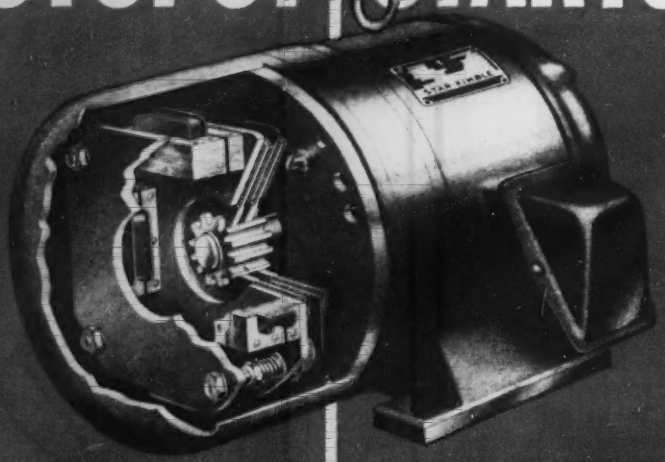
Smooth, Fast, Drag-free

STARTS



THROUGH MILLIONS OF CYCLES

WITH STAR-KIMBLE BRAKEMOTORS

Stopping of a Star-Kimble Brakemotor is split-second in action, precisely timed by simple adjustments. Quiet, too — no lining screech. Low lining pressure, evenly distributed, assures long brake life. Brake is self-adjusting to compensate for lining wear — ruggedly built to withstand shock and vibration.

Braking force is spring applied, magnetically released. No linkages to cause lost motion or friction.

Starting of a Star-Kimble Brakemotor is smooth and free from drag. Small magnetic air gap assures quick brake release without high inrush current.

And Star-Kimble Brakemotors *maintain* this fast, smooth stop-start operation through millions of cycles with little or no maintenance attention. Brake and motor are *designed* together to *work* together as a single compact unit. One manufacturer, one responsibility — backed by years of experience. For details on construction, motor ratings and braking torques, write for Bulletin B-501-A.

Standard and special motors of all types, 1 to 600 hp; Marine motors ½ to 600 hp; generators and motor-generator sets, 1 to 500 kw.

STAR-KIMBLE

MOTOR DIVISION OF

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220 Bloomfield Avenue Bloomfield, New Jersey

Severe grooving often results where pipe is in contact with condensate returns. This attack is localized

ject to contamination with gases and air-borne solids. Conditions in systems are quite favorable to bacterial and other biological growths. They generally necessitate control if adequate corrosion protection is to be attained with an inhibitor.

Recirculating cooling systems introduce a factor not often encountered in other water systems. Use of wooden cooling towers limits pH and concentration of alkaline sodium salts. Chlorine residuals also should not be excessive if chemical attack upon the wood is to be avoided.

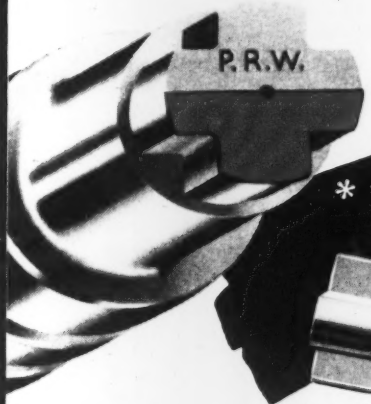
Scale — Deposition of calcium carbonate scale for corrosion control has been tried in many recirculating cooling systems, but generally with limited results. Variation of temperature in different portions of the system makes it particularly difficult to obtain uniform scale deposition.

Chromates—When chromate is employed as the inhibitor in a recirculating cooling system, an initial concentration of 500 to 1000 ppm is generally recommended.

Chromate dosage is lowered during the succeeding few months, after which 200 to 400 ppm usually is maintained in the circulating water. Concentration generally is held fairly high to avoid pitting and localization of attack. Concentration of chromate employed is dependent upon the chloride content of the recirculating water. High chlorides increase the quantity of chromate needed.

The pH of circulating water usually is kept between 7.5 and 9.5 when chromate is used. At lower

(Continued on p. 194)



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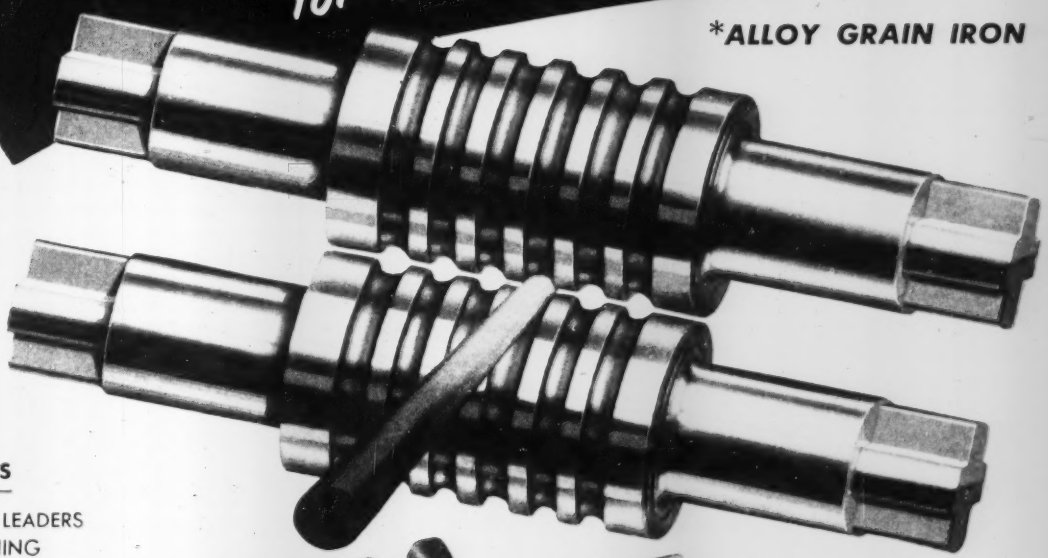
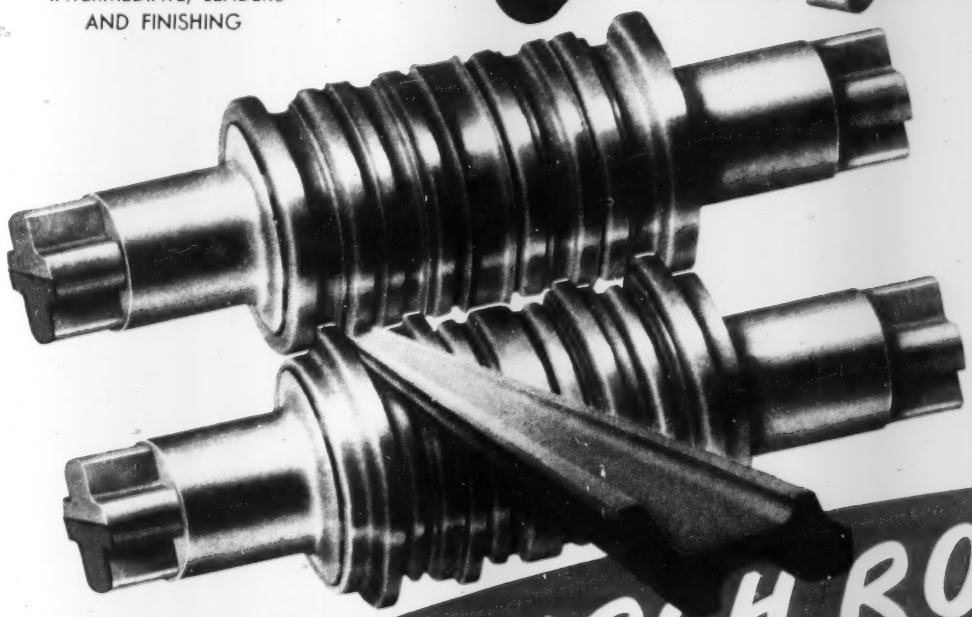
*ALLOY GRAIN IRON



ROUNDS

INTERMEDIATE, LEADERS AND FINISHING



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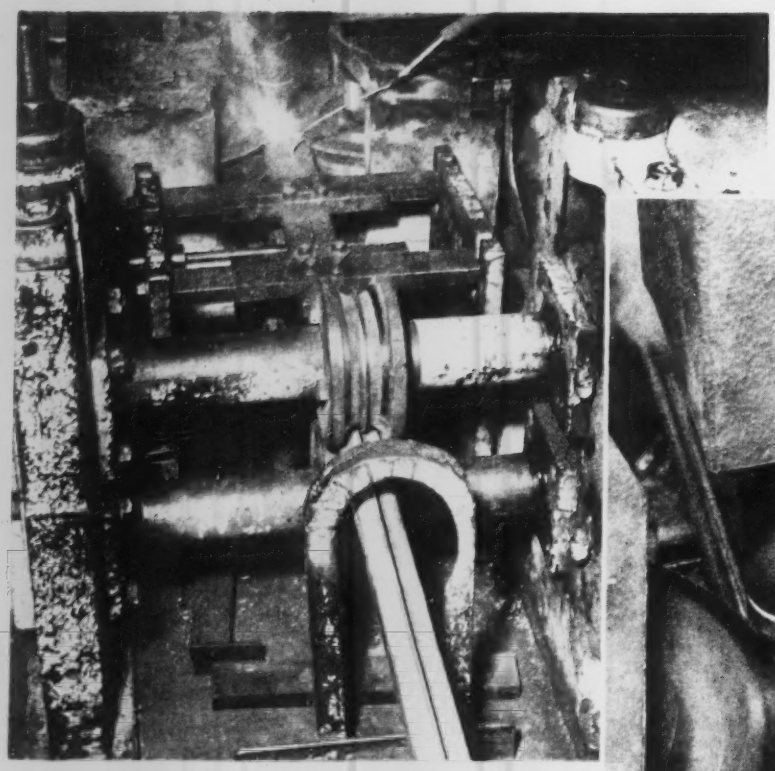
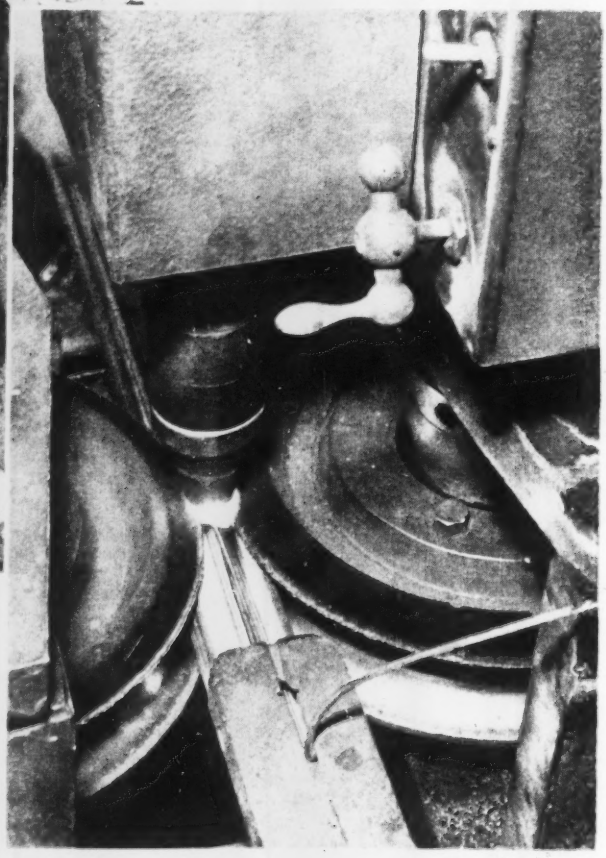
Carbon Steel



Guide roll positions the butted edges of the tubing for accurate pass beneath welding machine. Closeup shows arc heatup point and squeeze rolls



Automatic Welding . . .

Improves Stainless Tube Output

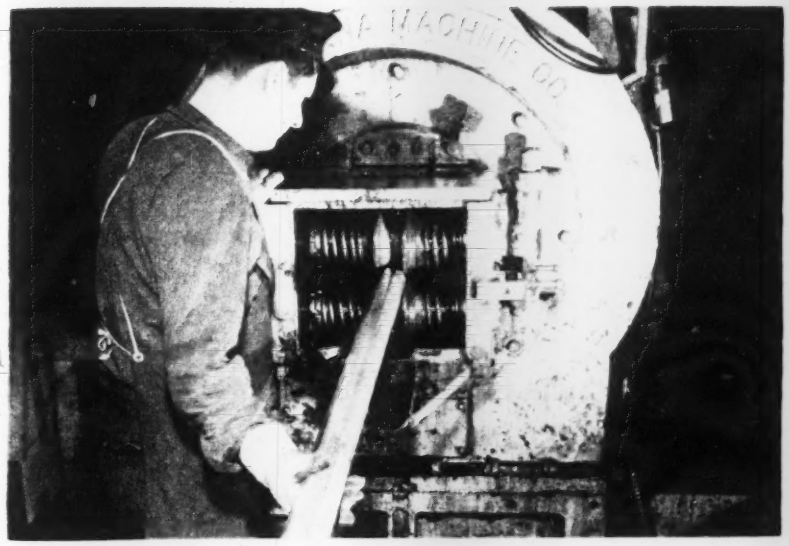
While practically all stainless tube producers use inert-gas non-consumable electrode welding, only 50 or 60 per cent are doing it automatically. Trend is gaining momentum

TWO MAJOR developments within the last 10 years have made fabrication of light gage stainless tubing easy, efficient and economical. Originally something of a problem to weld, inert-gas-shielded tungsten arc welding and automatic equipment for applying the process to volume repetitive jobs have put an end to the troubles.

Typical of current practice is the automatic setup at Damascus Tube Co., Greenville, Pa., where thousands of feet of corrosion-resistant pressure tubing are produced for a wide variety of uses.

Two Requirements—When a production welding job is of sufficient volume to justify use of fully-automatic equipment, two basic requirements have to be met to achieve best results. Parts have to fit closely, and they have to be held in proper relationship by substantial jigs and fixtures. Equipment at Damascus does both.

In the forming process, flat cold-rolled stainless strip is fed continuously from coils through a series of contoured rolls which



Stainless steel tubing, 2½ inches in diameter with 0.065-inch wall, is fed into swaging machine where weld is carefully blended to OD and ID contours

gradually shape the steel into a tube. Butted edges are welded together without filler metal to make a continuous wall. The inert-gas-shielded tungsten arc process produces a homogeneous weld possessing substantially the same physical and corrosion-resistant properties as the parent metal.

Carbide Troubles—Carbide precipitation is an important problem when welding stainless steel. If the metal is kept at elevated temperatures for any length of time, it loses its corrosion-resistant properties because the carbon combines with the chromium. Carbide precipitation is minimized in the inert-gas process because high welding speeds reduce the area exposed to high temperatures.

The temperature is, of course, governed by current used which in turn is controlled by metal thickness. However, by using helium and dc straight polarity, high currents may be used and very high welding speeds employed. Thus, while the current is high the speed is such that only a narrow zone is exposed to temperatures which are conducive to carbide formation.

Fast Cooling — Further, with only a narrow zone heated, the cooling rate is rapid. Best results are obtained by the use of small electrodes (non-consumable) and fast travel speeds.

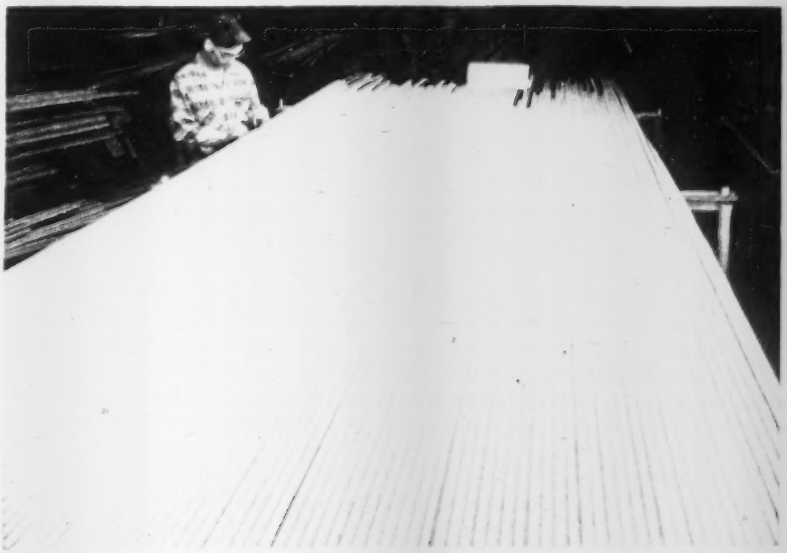
Damascus is using ⅛-inch diameter thoriated tungsten with 25 cfh helium, 223 amps, and is getting a welding speed on 1½ x 0.120-inch wall, 304 stainless of 16 inches per minute minimum. Speeds of 96 ipm are obtainable on thinner sections.

Fast Work—Speed of welding is a function of the rate of heat input to the work and varies with the mass of metal being welded. Use of helium in this instance, which provides a hotter arc than that obtained with argon, contributes to welding speed. Moreover, flux-free welding with no slag and spatter to clean up means additional time and labor savings.

After welding, the tubing is annealed and then fed through the swager, carefully blending the weld to the OD and ID contour. Operations which follow involve annealing for specified ductility, straightening, pickling and final inspection when each length is tested hydrostatically and mechanically for gage, size, tolerance, straightness and surface condition, both inside and out.

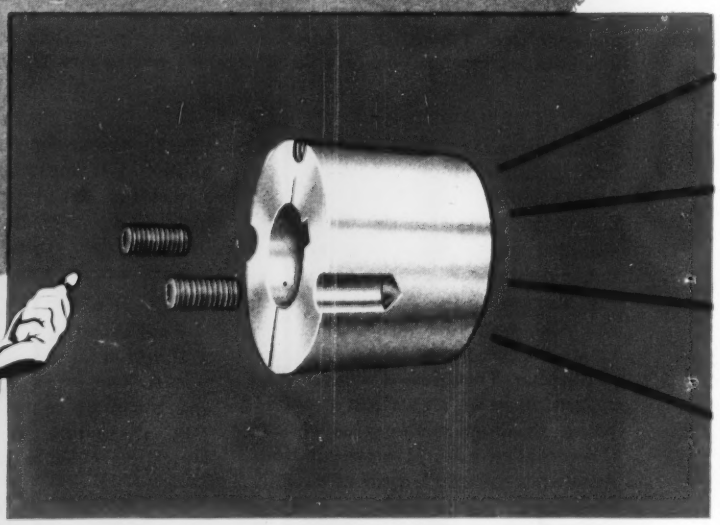
Old Method — Previously, Damascus used a mechanical method which involved the inert-gas-tungsten arc method without the benefits of automatic voltage (and arc length) control available in the automatic head. This automatic voltage control assures uniform penetration, hence permits the stepping up of welding speeds.

Automatic welding of stainless steel at Damascus reflects an important phase of the progress made in the fabrication of this material which was first produced on a commercial basis approximately twenty-five years ago. Particularly in the case of tube fabrication, where the joints on thin sections are very long, it is possible to obtain unprecedented welding speeds with this process.



White-pickle-finished tubing is here being inspected for gage, size, tolerance, straightness and conditions of surface, on both inside and outside

Now-Standardize on TAPER-LOCK



Now, for the first time, you can have all the benefits of standardizing on a truly modern method of mounting wheels on shafts . . . through the famous Dodge patented Taper-Lock design.

The time-saving, cost-cutting performance of Dodge Taper-Lock . . . already proved in millions of installations of Taper-Lock Sheaves, Couplings and Conveyor Pulleys . . . is now available in a complete line of Taper-Lock Sprockets with Dodge Roller Chain.

The bushing pictured here fits into the hub of every one of the Dodge products shown—sprockets, sheaves, couplings, conveyor pulleys. Both tapered bushings and hubs are precision machined to achieve perfect interchangeability. The result is less down-time on machines, simpler maintenance, reduced inventories. Taper-Lock gives you an unmatched opportunity to lower your costs and keep production rolling.

Dodge Taper-Lock grips the shaft for the full length of the bushing—holds with the firmness of a shrunk-on fit, yet comes off easily, quickly.

Taper-Lock's exclusive advantages were never more strikingly proved than in the new line of sprockets recently introduced by Dodge. For Taper-Lock brings to sprockets a new "off-the-shelf" availability. No time-consuming and costly reboring, key seating, drilling and tapping for set screws, needed to fit them to the shaft! Dodge Taper-Lock is available in both driver and driven sprockets from No. 40 to No. 100, up to 112 teeth. Taper-Lock bushings to fit shafts from ½" to 10" are available from stock.

Consider carefully the cost-saving advantages you get by standardizing on Taper-Lock — the modern method of mounting wheels on shafts. For further information, call your Dodge Distributor, or write the factory.

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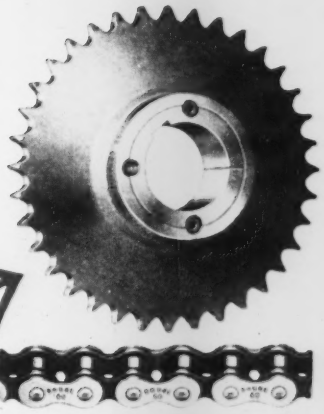
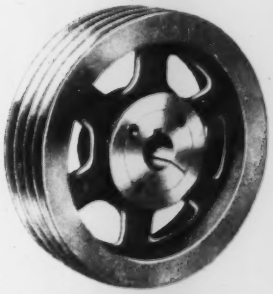


TAPER-LOCK SPROCKETS
and Dodge Quality Roller Chain

—THE MODERN WAY TO MOUNT SPROCKETS



TAPER-LOCK SHEAVES

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TAPER-LOCK COUPLINGS
Rigid and Flexible

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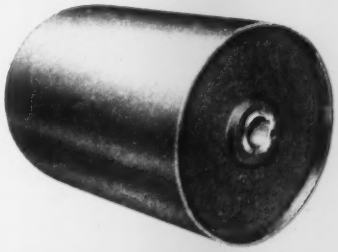
—THE MODERN WAY TO MOUNT CONVEYOR PULLEYS



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CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory-trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified phone book.

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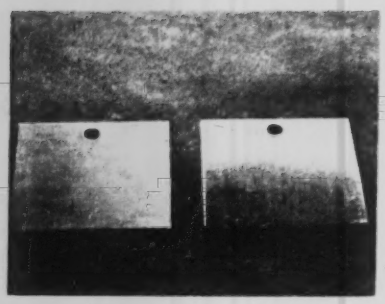


Pits, left plate, mean bacteria did not let inhibitor reach the surface. Chlorination prevents this, right

Extreme corrosion of the pipe nipple shown above was result of air leakage into the condensate return line

(Continued from p. 188)

pH values, chromate consumption tends to increase because of its reduction by organic matter. The pH range used with chromate usually requires auxiliary treatment for control of calcium carbonate.

Chromic Products—Products of chromic acid and complex natural organic material are used for corrosion control in recirculating cooling systems. Analytical control generally is based upon the chromate. Somewhat lower concentrations usually are maintained than when chromate alone is used. Organic matter is apt to consume considerable chlorine. Use of other algaecides and bactericides along with this treatment is indicated.

Problems of chromate waste disposal are intensified in recirculating cooling systems as a result of the rather large volumes of blowdown often required.

Glassy Phosphates—Glass phosphates are used for corrosion control in recirculating cooling systems. Maintenance of 10 to 15 ppm of molecularly dehydrated phosphate residual in the circulating water generally is recommended.

Optimum pH range for control of corrosion of iron and steel with glassy phosphates is from 5 to 7. One reason for the upper limit is to avoid localization of attack with attendant pitting and tuberculation characteristic of higher pH values. Second reason is to avoid calcium orthophosphate deposition.

Orthophosphate results from hydrolysis of some of the glassy phosphate. It is more noticeable in recirculating systems because of the relatively long retention of the glass phosphate in the system. Added factor is that temperatures may be on the high side.

When pH adjustment involves feed of acid, care should be exercised to avoid excessive additions. If pH drops much below 5, a gradual removal of the protective film of glass phosphate on the metal surface takes place. Rate of film removal increases as pH is lowered.

Other Metals—Presence of additional metals in an iron or steel system often modifies the pH range for glassy phosphates. For example, minimum pH was upped to 6.5 to prevent attack upon inlet-ends of lake copper condenser tubes. In another case, a similar increase in minimum pH was required to prevent dezincification of brass flexible hoses. Thus, where certain copper alloys are involved, a pH of 6.7 to 7 is often preferable.

Circulating waters that deposit calcium carbonate scale and also cause corrosion trouble are encountered frequently. Although the scale deposition in these waters can be controlled by glassy phosphates without auxiliary treatment, corrosion control under these conditions may be inadequate. Better results can be obtained in these systems by addition of acid to lower pH to at least 7 for glass phosphate treatment.

Glass phosphates are quite insensitive to the presence of chlorides. This is of considerable advantage in many recirculating systems. High chloride content may be encountered in many such circulating waters.

Mixed Inhibitors—Mixtures of the molecularly dehydrated phosphates (both glassy and crystalline varieties) with numerous other inhibitors have been used. They have been combined with chromates, silicates, organic materials, etc. Properties of such mixtures appear to be a combination of those of the individual components. A mixture of glassy phosphate with an inhibitor that can cause localization of attack if present in insufficient concentration tends to retain some of this property.

Preventive Maintenance Aid

Answering a demand for a hard overlay which could be applied with almost "skin thickness," Eutectic Welding Alloys Corp. of Flushing, New York, has produced Eutec-Instant-Overlay (KR 6900) in both powder and paste form. The new product, the manufacturer claims, can actually be painted on the metal surface and, after the application of torch or carbon arc to melt the paste, bonds to the metal to form a "skin-thick" film of hard wear-resistant overlay (up to 65 Rockwell C).

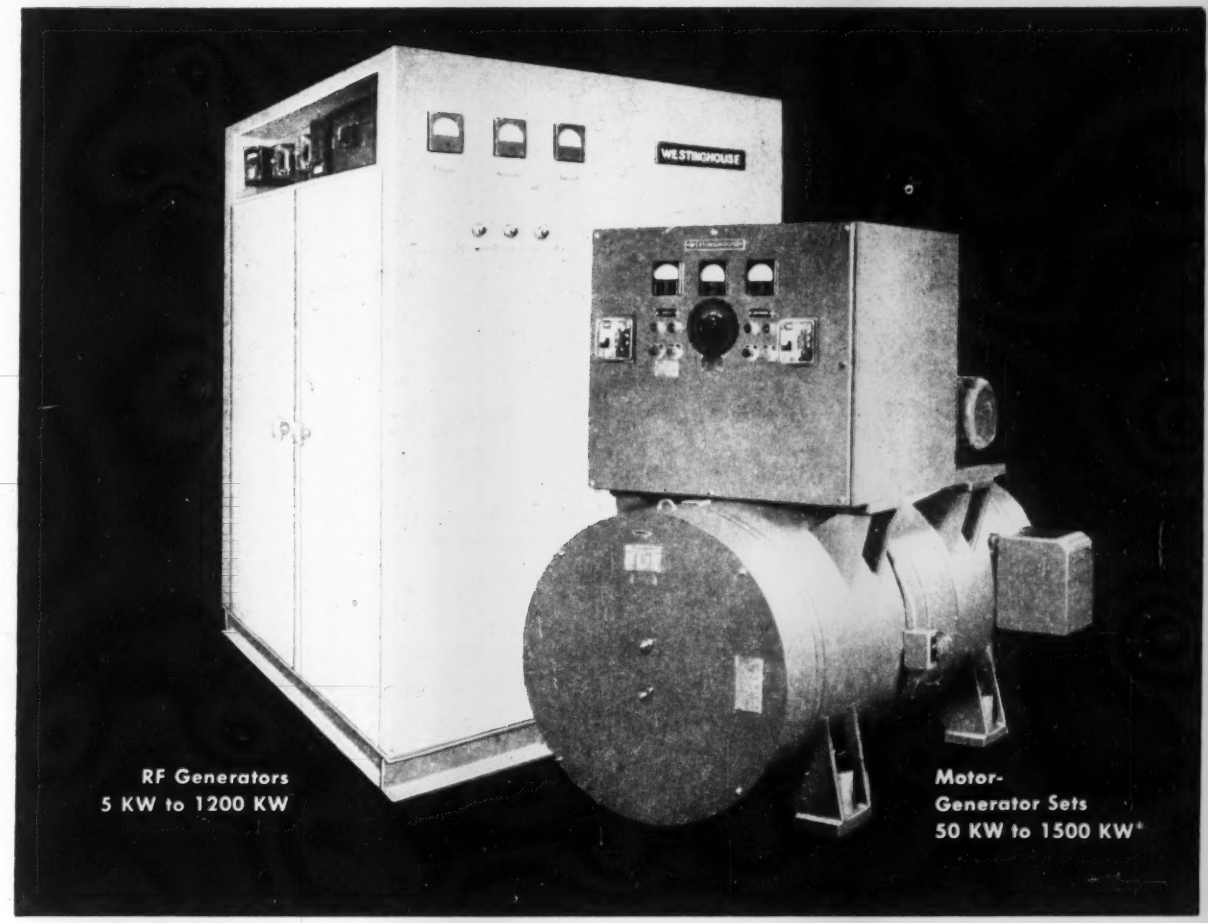
"KR 6900" can be applied either on new or old parts to yield increased life. Successive applications can be used to create a thicker film for even greater wear resistance.

It has applications in the field of maintenance work or preventive maintenance applications on elevator steps, ramps, fork trucks and similar farm and industrial applications.

In addition to this, the new Eutec-Instant-Overlay (KR 6900) has widespread use for application to new equipment . . . provides for increased life under abrasive conditons and other situations where a hard overlay of this type offers a solution.

Radioisotopes As Reagents

Development, application and instrumentation of the new microcurie radioisotopes is the subject of a bulletin, "Fisher Radioactive Reagents," just released by Fisher Scientific Co., Pittsburgh. These are the budget-priced carbon—14 tagged compounds that require no AEC authorization for use.



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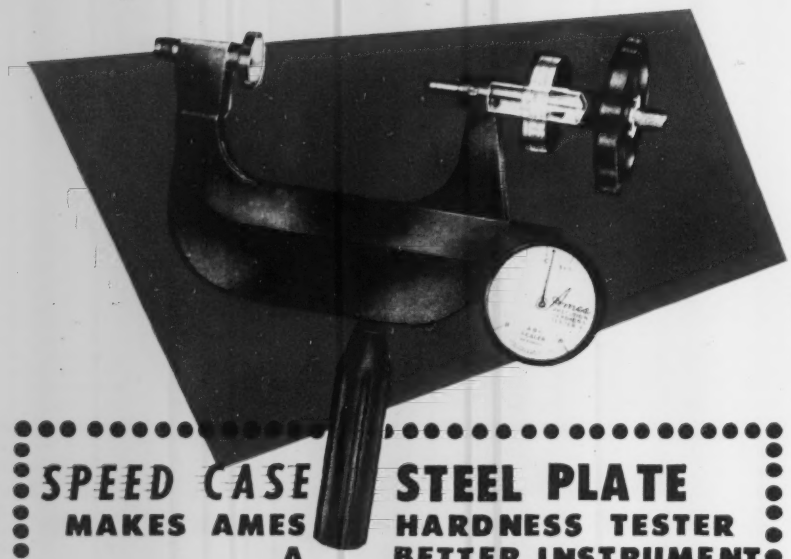
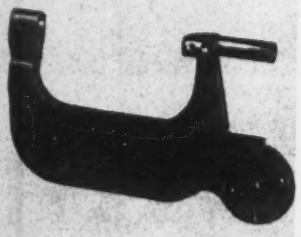


SPEED CASE STEEL PLATE MAKES AMES HARDNESS TESTER A BETTER INSTRUMENT

A Model 4 Ames Portable Hardness Tester manufactured by Ames Precision Machine Works, Waltham, Mass. is shown above. The dial is direct reading, indicating Rockwell A, B or C scale hardness on thicknesses up to 4".

Frame of the Ames Model 4, and several other models, is machined from **Speed Case** (X1515) low carbon, open hearth steel plate, supplied in flame cut blanks, as shown at right. The machined frame is shown in lower view, after magnifier retaining arm (1) and dial support (2) have been silver soldered to frame. **Speed Case** has proved ideal for this application for three reasons: (1) Available flame cut to close tolerance. (2) Ease of machining, longer tool life, more readily polished and (3) Superior physical properties rendering it more suitable for a precision instrument.



Probably one of the **Speed Steels—Speed Case, Speed Treat** or **Speed Alloy**—can cut your costs while improving your product. **Send for literature.**

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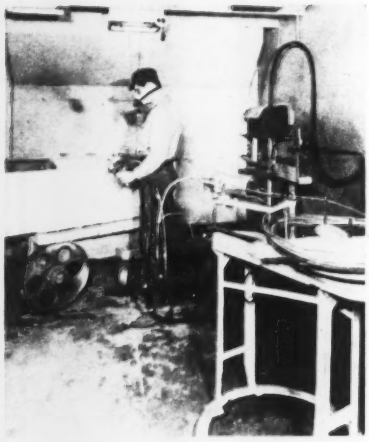
Produced by W. J. Holliday & Co., Inc., Speed Steel Plate Division, Hammond, Indiana. Plants: Hammond and Indianapolis, Indiana



High-Speed Hand Spray

Manufacturers of porcelain cast iron sanitary fixtures usually spray patterns with copper, then finish to size. Since patterns are large, it is necessary to develop equipment that gains high spraying speeds. Metallizing Co. of America adapted a 6-foot flexible extension to its Meguelectric gun to produce equipment that hand-sprays 3/16-inch wire 50 per cent faster

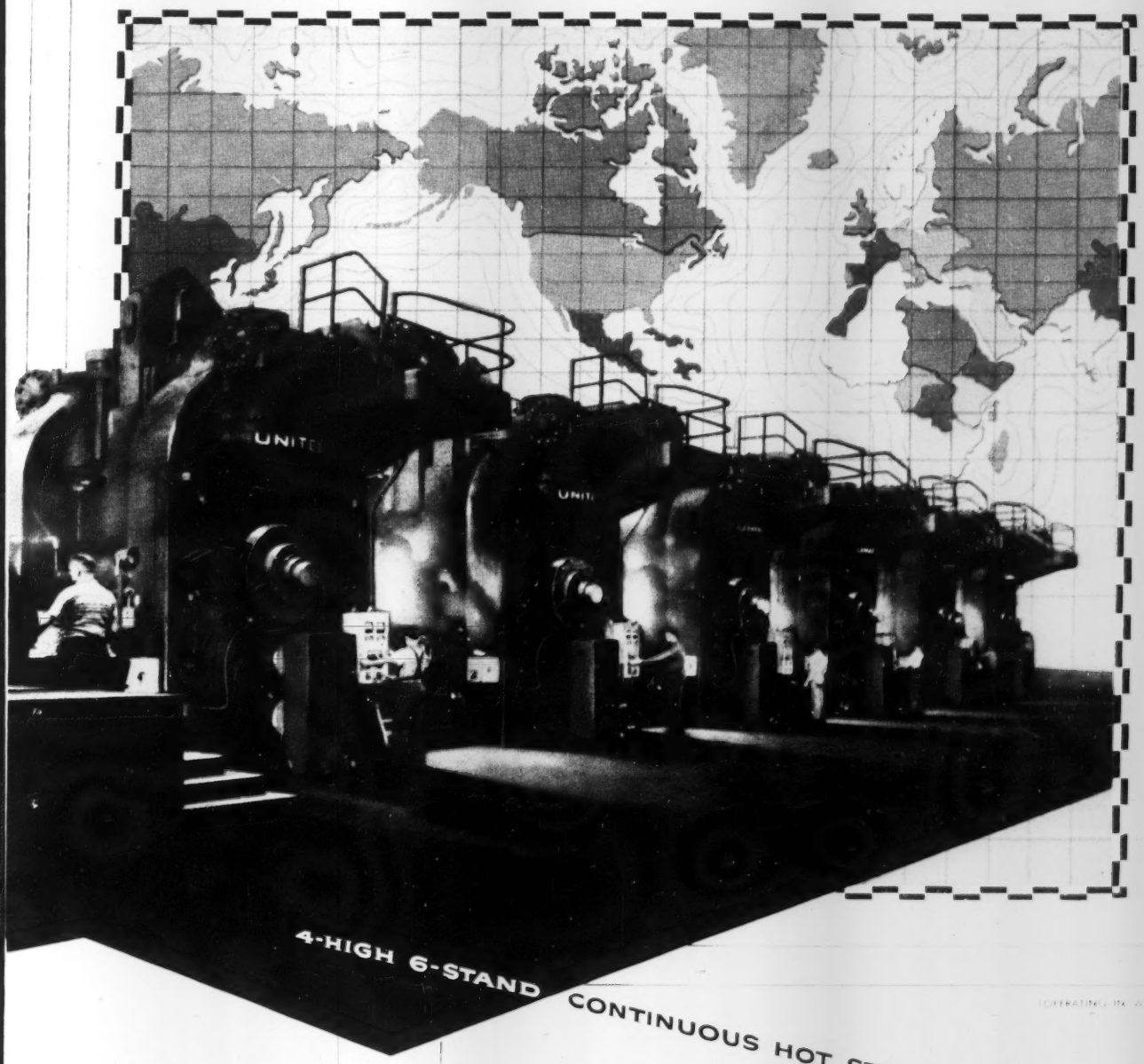
Broaching Brake Shoes

Reduced loading and unloading time, thereby speeding broaching operation on automotive brake shoes, plus pneumatic positioning and hydraulic clamping are combined on a Colonial Broach Co. model. The machine is a standard dual-ram 10-ton 54-inch stroke, with specially designed shuttle fixtures. Insert-type broaches cut a slot at one end and a concave at the other at a rate of 400 brake shoes per hour.

Single manual control of three pneumatic cylinders enables the brake shoe to be positioned accurately against three stops. Release of the part is just as fast, after broaching.

Hydraulic clamping, with a single cylinder actuating a saddle clamp, is an integral part of the automatic broaching cycle. Since there are two shuttle fixtures, one can be loaded and unloaded while the other is going through the broaching cycle.

Stock removal on both the 1/2-inch slot and the 13/32-inch concave is 13/32-inch maximum. Thickness is 13/32-inch at concave and 3/16-inch at the slot.



4-HIGH 6-STAND CONTINUOUS HOT STRIP MILL

(OPERATING IN WALES)

DESIGNED AND BUILT BY

UNITED

ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

Plants: PITTSBURGH • VANDERGRIFT • NEW CASTLE • YOUNGSTOWN • CANTON

Subsidiaries: ADAMSON UNITED COMPANY, AKRON, OHIO • FORGED UNITED COMPANY, WILMINGTON, DELAWARE • STEDMAN FOUNDRY AND MACHINE CO., INC., AURORA, INDIANA

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other Heavy Machinery. Manufacturers of Iron, Modular Iron and Steel Castings, and Weldments.

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BIRMINGHAM, ALA.	DETROIT, MICH.	PITTSBURGH, PENNA.
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	SEATTLE, WASH.	

LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Market Outlook

PREMIUM PRICES on iron and steel are fading away. This is the second phase of price readjustment to a reduced demand for steel.

In the first phase of readjustment, the demand for conversion steel, a costly product, disappeared during the summer.

COMING?— If the demand for iron and steel continues to ebb, the third phase of readjustment will be a general move on the part of producers to absorb freight charges. Already there is a small amount of freight absorption.

Then if further readjustments are necessary, price extras might be waived and base prices cut.

CONCENTRATED— The first two phases of readjustment—death of demand for conversion steel and disappearance of premium prices—affect only a small portion of the country's steel producing capacity, for only a small proportion of the total steel output was in conversion tonnage and only a few small producers were charging premium prices.

These first two phases of readjustment are in line with expectations. Everybody knew that when the frenzy of steel demand melted away, buyers would not pay more than the regular market prices.

PREMIUMS FADE— The last week brought more evidence of premium price reductions than any other one in recent history. An Ohio mill came down to the regular market prices on wire rods and manufacturers wire by making a $4-a-ton reduction in each. A Pennsylvania mill lowered carbon steel plates $31 a ton, but it still is at least $8 a ton over the regular market. Another Pennsylvania mill cut prices on hot-rolled carbon sheet and strip $5.50 a ton, but it is still $2.50 above most other producers. The same producer lowered prices of merchant pig iron $2 a ton and acquired a competitive advantage in some marketing areas.

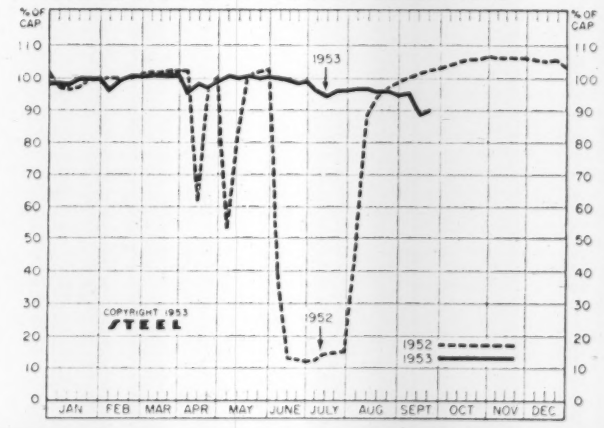
A Michigan steel producer reduced alloy steel forging billets and hot-rolled alloy bars $1 a ton, but it still is $2 above most other producers.

PRICES DROP— Other price changes include a reduction on export tin mill products and downward revisions in galvanized products. Tin mill products for export were reduced 50 cents a base box, except coke tin plate which is down 51 cents. U. S. tin mill products have been encountering increasing foreign competition at the same time the domestic demand is lagging. Galvanized products, including pipe and sheets, were reduced to reflect the half-cent decline in zinc Sept. 11. That decline put zinc down to 10 cents a pound, E. St. Louis. In reaction to the zinc price decline, lead slipped off a half cent to 13.30 cents a pound, St. Louis, Sept. 16.

SCRAP SAGS— Reflecting the lowered demand for steel, the price of steel scrap—one of the principal raw materials in steelmaking—sagged further and dropped STEEL's price composite on steelmaking grades of scrap to $37.50 a ton, a decline of $1.17 from the preceding week. Few new orders for scrap are coming out.

STRIKE HURTS— Steel production is not as high as it was earlier this year but it would be higher were it not for the strike at the Lackawanna, N. Y., plant of Bethlehem Steel Co. The national production rate, at 90 per cent of capacity in the week ended Sept. 19, was 1.5 points higher than in the preceding week.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged at leading production points)

	Week Ended Sept. 19	Change	Same Week 1952	Same Week 1951
Pittsburgh	93	— 0.5*	99.5	99
Chicago	101	+ 1*	105	105
Mid-Atlantic	97	— 0.5	98	100
Youngstown	105	0	105	105
Wheeling	98	+ 2	98	97
Cleveland	102	+ 2.5	107.5	100.5
Buffalo	26	— 5.5	104.5	104
Birmingham	98	— 1	100	90
New England	87	+ 2	82	82
Cincinnati	79.5	+ 3	94	100
St. Louis	95	+ 10.5	101	93
Detroit	101	— 3.5	100	106
Western	99.5	+ 9.5	103	103
Estimated National Rate	90	+ 1.5	102	101

*Change from preceding week's revised rate.

Weekly steelmaking capacity is estimated at 2,254,459 net tons in 1953; 2,077,040 tons in 1952; 1,999,034 tons in 1951.

The Metalworking Outlook—p. 77 Technical Outlook—p. 127

PRICE INDEXES AND COMPOSITES

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics) Week Ended Sept. 15

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, standard, No. 1	$4.400	Bars, H.R., alloy	$8.675	Strip, C.R., stainless, 430 (lb)	$0.415	Tin plate, hot-dipped, 1.25 lb	$8.433
Rails, light, 40 lb	5.767	Bars, H. R., stainless, 303 (lb)	0.418	Strip, H.R., carbon	5.113	Tin plate, electrolytic, 0.25 lb	7.133
Tie Plates	5.125	Bars, H.R., carbon	4.850	Pipe, black, buttweld (100 ft)	14.454	Black plate, can making quality	6.233
Axles, railway	7.250	Bars, reinforcing	4.775	Pipe, galv., buttweld (100 ft)	17.731	Wire, drawn, carbon	7.713
Wheels, freight car, 33 in. (per wheel)	47.000	Bars, C.F., carbon	7.860	Pipe, line (100 ft)	141.960	Wire, drawn, stainless, 430 (lb)	0.545
Plates, carbon	4.550	Bars, C.F., alloy	11.075	Casing, oil well, carbon (100 ft)	149.516	Bale ties (bundle)	5.653
Structural Shapes	4.383	Bars, C.F., stainless, 302 (lb)	0.433	Casing, oil well, alloy (100 ft)	214.113	Nails, wire, 8d common	7.530
Bars, tool steel, carbon (lb)	0.415	Sheets, H.R., carbon	4.765	Tubes, boiler (100 ft)	‡	Wire, barbed (80-rod spool)	6.847
Bars, tool steel, alloy, oil hardening die (lb)	0.505	Sheets, C.R., carbon	5.904	Tubing, mechanical, carbon (100 ft)	‡	Woven wire fence (20-rod roll)	16.174
Bars, tool steel, H.R. alloy, high speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.135	Sheets, galvanized	6.945	Tubing, mechanical, stainless, 304 (100 ft)	161.193	‡Not available.	
Bars, tool steel, H.R. alloy, high speed W18, Cr 4, V 1 (lb)	1.730	Sheets, C.R., stainless, 302 (lb)	0.548				
		Sheets, electrical	9.183				
		Strip, C.R., carbon	7.371				

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Sept. 15 1953	Sept. 8 1953	Month Ago	Aug. Average
(1947-1949=100)	141.7	141.7	141.7	141.7

STEEL's FINISHED STEEL PRICE INDEX

	Sept. 17 1953	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	189.38	189.38	189.38	181.31	143.08
Index in cents per lb.	5.130	5.130	5.130	4.912	3.876

STEEL's ARITHMETICAL PRICE COMPOSITE*

	Sept. 17 1953	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Finished Steel, NT	$115.56	$115.56	$115.56	$110.98	$95.05
No. 2 Fdry. Pig Iron, GT.	56.54	56.54	56.54	55.04	44.30
Basic Pig Iron, GT	56.04	56.04	56.04	54.66	43.86
Malleable Pig Iron, GT.	57.27	57.27	57.27	55.77	44.68
Steelmaking Scrap, GT.	37.50	38.67	43.17	43.00	43.33

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

COMPARISON OF PRICES

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Sept. 17 1953	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.15	4.15	4.15	3.95	3.45
Bars, H.R., Chicago	4.15	4.15	4.15	3.95	3.35
Bars, H.R., del. Philadelphia	5.302	5.302	5.302	4.502	3.79
Bars, C.F., Pittsburgh	5.20	5.20	5.20	4.925	3.95
Shapes, Std., Pittsburgh	4.10	4.10	4.10	3.85	3.25
Shapes, Std., Chicago	4.10	4.10	4.10	3.85	3.25
Shapes, deld., Philadelphia	4.38	4.38	4.38	4.13	3.48
Plates, Pittsburgh	4.10	4.10	4.10	3.90	3.50
Plates, Chicago	4.10	4.10	4.10	3.90	3.40
Plates, Coatesville, Pa.	4.35	4.35	4.35	4.35	3.75
Plates, Sparrows Point, Md.	4.10	4.10	4.10	3.90	3.45
Plates, Claymont, Del.	4.55	4.55	4.55	4.25	3.95
Sheets, H.R., Pittsburgh	3.925	3.925	3.925	3.775	3.275
Sheets, H.R., Chicago	3.925	3.925	3.925	3.775	3.25
Sheets, C.R., Pittsburgh	4.775	4.775	4.775	4.575	4.00
Sheets, C.R., Chicago	4.775	4.775	4.775	4.575	4.00
Sheets, C.R., Detroit	4.975	4.975	4.975	4.775	4.20
Sheets, Galv., Pittsburgh	5.275	5.275	5.275	5.075	4.40
Strip, H.R., Pitts.	3.975-4.425	3.975-4.425	3.975-4.425	3.75-4.225	3.275
Strip, H.R., Chicago	3.925	3.925	3.925	3.725	3.275
Strip, C.R., Pittsburgh	5.45-5.95	5.45-5.95	5.45-5.95	5.10-5.80	4.00
Strip, C.R., Chicago	5.70	5.70	5.70	5.35	4.125
Strip, C.R., Detroit	5.45-6.05	5.45-6.05	5.45-6.05	5.30-6.05	4.20
Wire, Basic, Pitts.	5.475-5.525	5.475-5.525	5.475-5.525	5.10-5.225	4.15
Nails, Wire, Pittsburgh	6.35-6.55	6.35-6.55	6.35-6.55	6.20-6.35	5.15
Tin plate (1.50 lb), box, Pitts.	$8.95	$8.95	$8.95	$8.95	$6.70

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$75.50	$75.50	$75.50	$70.50	$61.00
Wire rods, $\frac{1}{2}$-$\frac{9}{16}$", Pitts.	4.525	4.525	4.525	4.325	3.45

PIG IRON, Gross Ton	Sept. 17 1953	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bessemer, Pitts.	$57.00	$57.00	$57.00	$55.50	$47.00
Basic, Valley	56.00	56.00	56.00	54.50	43.00
Basic, deld. Phila.	60.75	60.75	60.75	59.25	46.17
No. 2 Fdry, Pitts.	56.50	56.50	56.50	55.00	46.50
No. 2 Fdry, Chicago	56.50	56.50	56.50	55.00	43.25
No. 2 Fdry, Valley	56.50	56.50	56.50	55.00	43.50
No. 2 Fdry, deld. Phila.	61.25	61.25	61.25	59.75	46.67
No. 2 Fdry, Birm.	52.88	52.88	52.88	51.38	43.38
No. 2 Fdry (Birm.) del. Cin.	60.43	60.43	60.43	58.93	49.09
Malleable, Valley	56.50	56.50	56.50	55.00	43.50
Malleable, Chicago	56.50	56.50	56.50	55.00	43.50
Ferromanganese, Duquesne.	200.00†	200.00†	200.00†	228.00*	148.00*

*78-82% Mn, per gross ton, Etna, Pa. †74-76% Mn, per net ton.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pitts.	$40.50	$41.50	$45.50	$44.00	$42.75
No. 1 Heavy Melt, E. Pa.	36.50	39.00	42.50	41.50	45.50
No. 1 Heavy Melt, Chicago	35.50	35.50	41.50	42.50	41.75
No. 1 Heavy Melt, Valley	36.50	39.50	45.50	44.00	42.75
No. 1 Heavy Melt, Cleve.	33.50	35.50	44.50	43.00	42.25
No. 1 Heavy Melt, Buffalo	39.50	41.50	43.75	43.00	46.25
Rails, Rerolling, Chicago	52.00	52.00	56.00	52.50	63.25
No. 1 Cast, Chicago	35.00	35.00	42.00	48.50	70.00

COKE, Net Ton					
Beehive, Furn, Connlsvl.	$14.75	$14.75	$14.75	$14.75	$14.25
Beehive, Fdry, Connlsvl.	16.75	16.75	16.75	17.00	17.00
Oven Fdry, Chicago	24.50	24.50	24.50	23.00	20.40

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

PRIMARY METALS AND ALLOYS

Aluminum: 99% plus, ingots 21.50, pigs 20.00, 10,000 lbs or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 23.30; No. 43, 5% Si, 23.10; No. 142, 4% Cu, 24.40; No. 195, 4.5% Cu, 0.8% Si, 23.70; No. 214, 3.8% Mg, 24.40; No. 356, 7% Si, 0.3% Mg, 23.20.

Antimony: R.M.M. brand, 99.5% 34.50. Lone Star brand, 35.00, f.o.b. Laredo, Texas, in bulk. Foreign brands, 99.5%, 25.50-26.00 New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa.

Beryllium Copper: 3.75-4.25% Be, $40.00 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $2.00 per lb deld.

Cobalt: 97-99%, $2.40 per lb for 550 lb keg; $2.42 per lb for 100 lb case; $2.47 per lb under 100 lb.

Columbium: Powder, $75.00 per lb, nom.

Copper: Electrolytic 29.00-30.00 deld. Conn. Valley, 29.125-30.125 deld. Midwest; Lake 30.125 deld.; Fire refined 29.75 deld.

Germanium: 99.9%, $350.00 per lb nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $165-$175 per troy oz.

Lead: Common 13.30, chemical 13.90, corroding 13.90, St. Louis. New York basis, add 0.20.

Lithium: 98%, $10-$13 per lb, depending on quantity.

Magnesium: 99.8% standard ingots 27.00, 10,000 lb or more, f.o.b. Freeport, Tex. Sticks, 1.3 in. dia., 45.00, 100 to 4999 lb.

Magnesium Alloys: AZ91B 30.50; AZ91C and alloys C, H, G and R 32.50; alloy M 34.50, 10,000 lb or more.

DAILY NONFERROUS PRICE RECORD

	Price Sept. 17	Last Change	Previous Price	Aug. Avg.	July Avg.	Aug., 1952 Avg.
Copper	29.00-30.00	Aug. 19	28.50-30.00	29.375	29.846	24.500
Lead	13.30	Sept. 16	13.80	13.800	13.483	15.800
Zinc	10.00	Sept. 11	10.50	11.000	11.000	14.067
Tin	81.00 nom.	Sept. 17	81.125	80.530	81.577	121.500
Nickel	60.00	Jan. 14	56.50	60.000	60.000	56.500
Aluminum	21.50	July 15	20.50	21.500	20.923	19.923
Magnesium	27.00	Mar. 9	24.50	27.000	27.000	24.500

Quotations in cents per pound based on: Copper, deld. Conn. Valley; Lead, common grade, deld. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, deld. New York; Nickel, electrolytic cathodes, 99.9%, base size at refinery unpacked; Aluminum, primary ingots, 99% plus, deld.; Magnesium, 99.8%, Freeport, Tex.

Mercury: Open market, spot, New York, $180-$191 per 76-lb flask.

Molybdenum: Powder, 99% hydrogen reduced $3.40 per lb; pressed ingot $4.06 per lb; sintered ingot $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 60.00; 25-lb pigs 62.65; "XX" nickel shot 63.65; "F" nickel shot or ingots, for addition to cast iron 60.00; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $140-$150 per troy oz. nom.

Palladium: $23-$24 per troy oz.

Platinum: $91-$93 per troy oz. from refineries.

Radium: $16.00-$21.50 per mg. radium content, depending on quantity.

Rhodium: $125 per troy oz.

Ruthenium: $80-$85 per troy oz.

Selenium: 99.5%, $4.25-$4.75 per lb.

Sodium: 16.50, carlots; 17.00 l.c.l.

Tantalum: Sheet, rod $42.45 per lb; powder $33.50 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, New York, 81.00 nom.

Tungsten Powder: 98.8%, carbon reduced, 1000 lb lots $5.35 per lb deld.; less than 1000 lb $5.50; 99% plus hydrogen reduced $6.40. Treated ingots $10.43 per lb.

Zinc: Price western 10.00, brass special 10.25, intermediate 10.50, E. St. Louis, freight allowed over 0.50 per pound. High grade 11.35, special high grade 11.50, die casting alloy ingot 14.50, deld.

Zirconium: Sponge $14.00 per lb; powder 100 lb or more $7.00; less than 100 lb $8.00. (Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys 22.00-22.50; No. 12 foundry alloy (No. 2 grade) 21.50-22.00; 5% silicon alloy, 0.60 Cu max., 23.25-24.25; 13 alloy, 0.60 Cu max., 23.00-23.50; 195 alloy 22.00-23.50; 108 alloy 22.00-22.50; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 21.75-23.50; grade 2, 20.75-21.25; grade 3, 19.75-20.25; grade 4, 18.50-20.00.

Brass Ingot: Red brass, No. 115, 24.50; tin bronze, No. 225, 35.25, No. 245, 29.50; high-leaded tin bronze, No. 305, 28.75; No. 1 yellow, No. 405, 20.75; manganese bronze No. 421, 25.25.

Magnesium Alloy Ingot: AZ63A, 31.50; AZ91B, 31.50; AZ91C, 32.00; AZ92A, 31.50.

NONFERROUS MILL PRODUCTS

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000 lb lots, 35.36; 30,000 lb lots, 35.48; l.c.l. 35.98. Weatherproof, 100,000 lb, 36.28; 30,000 lb, 36.53; l.c.l., 37.03. Magnet wire deld., 15,000 lb or more 41.83; l.c.l., 42.58.

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more $18.50 per cwt; pipe, full coils $18.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forging billets, $6; hot-rolled and forged bars, $6.

ZINC

Sheets 23.00, f.o.b. mill, 36,000 lb and over. Ribbon zinc in coils, 19.50-20.50, f.o.b. mill, 36,000 lb and over. Plates 19.50-20.75.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheet, C.R. ..	86.5	67.5	92.5
Strip, C.R. ...	92.5	70.5	98.5
Plate, H.R. ..	84.5	66.5	90.5
Rod, Shapes ..	82.5	65.5	88.5
Seamless Tubes	115.5	100.5	137.5
Shot, Blocks...	....	60.0	....

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more.)

Sheets and Circles: 2S and 3S mill finish c.l.c.

Thickness Range Inches	Widths or Diameters, In., Inc.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	33.9	...	...
0.135-0.096	12-48	34.4	...	...
0.095-0.077	12-48	35.1	32.7	37.5
0.076-0.061	12-48	35.7	32.9	37.7
0.060-0.048	12-48	36.1	33.2	38.1
0.047-0.038	12-48	36.6	33.6	38.4
0.037-0.030	12-48	37.0	34.0	39.1
0.029-0.024	12-48	37.6	34.3	39.6
0.023-0.019	12-36	38.3	35.1	40.4
0.018-0.017	12-36	39.1	35.7	41.3
0.016-0.015	12-36	40.0	36.5	42.5
0.014	12-24	41.0	37.5	43.8
0.013-0.012	12-24	42.1	38.2	44.8
0.011	12-24	43.1	39.4	46.4
0.010-0.0095	12-24	44.3	40.5	48.0
0.009-0.0085	12-24	45.6	41.9	50.0
0.008-0.0075	12-24	47.1	43.1	51.8
0.007	12-18	48.6	44.6	54.1
0.006	12-18	50.2	46.0	59.1

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

ALUMINUM

Plates and Circles: Thickness 0.250-3 in., widths or diameters 24-60 in., lengths 72-240 in.

Alloy	Plate Base	Circle Base
2S-F, 3S-F	32.4	36.3
50S-F	33.5	37.4
4S-F	34.5	39.1
52S-F	36.2	40.9
61S-T6	37.4	41.5
24S-T4*	39.3	45.4
75S-T6*	47.1	53.7

* Widths or diameters 24-48 in., lengths 72-180 in.

ALUMINUM

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or distance across flats	—Round— 11S-T3	17S-T4	—Hexagonal— 11S-T3	17S-T4
Drawn				
0.125	59.6	57.9	...	...
0.156-0.172	50.6	48.9	...	...
0.188	50.6	48.9	...	62.4
0.219-0.234	47.9	46.2	...	...
0.250-0.281	47.9	46.2	...	59.5
0.313	47.9	46.2	...	56.8
Cold-finished				
0.375-0.531	46.6	44.9	56.2	53.4
0.563-0.688	46.6	44.9	53.4	50.2
0.750-1.000	45.5	43.8	48.9	47.3
1.063	45.5	43.8	...	45.7
1.125-1.500	43.8	42.1	47.3	45.7
Rolled				
1.563	42.7	41.0	...	...
1.625-2.000	42.1	40.4	...	44.1
2.125-2.500	41.1	39.4	...	...
2.750-3.375	39.9	38.2	...	...

ALUMINUM

Forging Stock: Round, Class 1, 42.05-32.76, in specific lengths 36-144 in., diameters 0.375-8 in.; rectangles and squares, Class 1, 49.2 to 37.6 in random lengths 0.375-4 in. thick, widths 0.750-10 in.

Industrial Roofing Sheet (0.032-in. thick): Flat, 42.75 in. wide, lengths 60-144 in., $2.838 to $6.816 per sheet. Corrugated, 35 in. wide, lengths 60-144 in., $2.862 to $6.874 per sheet.

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032-in. 108.00, 0.064-in. 81.00, 0.125-in. 71.00, 30,000 lb and over, f.o.b. mill.

Plate: Hot-rolled, AZ31, 53.00, 20,000 lb or more 0.188-1 in. thick, widths to 48 in., lengths to 144 in.; raised pattern floor plate, 69.00, 20,000 lb or more, ¼-in. thick, widths 24-48 in., lengths 60-144 in.

Extrusion Stock: AZ31, Rectangles, ¼ x 2 in. 69.20, 1 x 4 in. 63.00. Rod, 1 in. 66.00, 2 in. 62.50. Tubing, 1 in. OD x 0.065-in. 87.00. Angles, 1 x 1 x ⅛-in. 72.90, 2 x 2 x ⅛-in. 67.00. Channels, 5 in. 67.80. I-Beams, 5 in. 66.20.

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 2S clipping 13.00; low copper clippings 10.00, mixed clippings 10.00; old sheet 9.00; borings and turnings 6.50; pistons and struts 6.50; crankcases 9.00; industrial castings 9.00.

Copper and Brass: Heavy copper and wire, No. 1 21.00; No. 2 copper 18.50-19.50; light copper 16.50; No. 1 composition red brass 15.00; No. 1 composition turnings 14.50; mixed brass turnings 9.00; new brass clippings 18.50 nom.; No. 1 brass rod turnings 13.00 nom.; light brass 9.00; heavy yellow brass 11.00; new brass rod ends 17.50 nom.; auto radiators, unsweated 11.00; cocks and faucets 13.00; brass pipe 14.50.

Lead: Heavy 9.50-10.00; battery plate 5.25-5.75; linotype and stereotype 11.75; electrotype 10.50; mixed babbitt 12.00.

Magnesium: Clippings 20.00-21.00; clean castings 19.00-20.00; iron castings, not over 10% removable Fe, 18.00-19.00.

Monel: Clippings 28.00-30.00; old sheet 26.00-27.00; turnings 19.00-21.00; rods 28.00-30.00.

Nickel: Sheets and clips 80.00; rolled anodes 80.00; turnings 50.00; rod ends 80.00.

Tin: No. 1 pewter 40.00-45.00; block tin pipe 65.00-67.00; No. 1 babbitt 37.00-38.00.

Zinc: Old zinc, 3.50; new die cast scrap, 3.50; old die cast scrap, 3.25.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 2S, 3S clippings 15.00-15.50; 51S, 52S clippings 15.00-15.50; 14S, 17S, 24S clippings 14.00-14.50; mixed clippings 14.00-14.50; old sheet 12.50-13.00; old cast 12.50-13.00; clean old cable, free of steel 14.50-15.50; borings and turnings 13.00-13.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 42.00; light scrap 37.00.

Copper, Brass: No. 1 copper 23.50 nom.; No. 2 copper 21.50; light copper 20.00; refinery brass (60% copper) per dry copper content 18.50; auto radiators 13.00 nom.

INGOT MAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper, Brass: No. 1 copper 23.00-23.50; No. 2 copper 21.50; light copper 20.00; No. 1 composition borings 16.50; No. 1 composition solids 17.25; heavy yellow brass solids 13.00; yellow brass turnings 12.25; radiators 13.00.

PLATING MATERIALS

(F.o.b. shipping points, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes $2.18 per lb.

Copper: Flat-rolled 45.04, oval 44.54, 2000-5000 lb electrodeposited 39.78, cast 42.04, 5000-10,000 lb lots.

Nickel: Depolarized, less than 500 lb 92.00; 500-4999 lb 88.00; over 5000 lb 86.00.

Tin: Bar or slab, less than 200 lb 99.05; 200-499 lb 98; 500-999 lb 97.5; 1000 lb or more 97.

Zinc: Bar 18.50, bar or flat top 17.50, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb. In 100 lb drums.

Chromic Acid: Less than 2000 lb 29.00; over 2000 lb 28.75.

Copper Cyanide: Under 1000 lb 63.90, 1000 lb and over 61.90.

Copper Sulfate: 100-6000 lb 11.35; 6000-12,000 lb 11.10; 12,000-24,000 lb 10.85; 24,000-36,000 lb 10.60; 36,000 lb and over 10.35.

Nickel Chloride: 100 lb 45.00; 200 lb 43.00; 300 lb 42.00; 400-4900 lb 40.00; 5000-9900 lb 38.00; 10,000 lb and over 37.00.

Nickel Sulfate: 100 lb 37.00; 200 lb 35.00; 300 lb 34.00; 400-4900 lb 32.00; 5000-35,900 lb 30.00; 36,000 lb and over 29.00.

Silver Cyanide: Cents per ounce, 16 oz 80.625; 100 oz 78.500; 2500 oz and over 77.375.

Sodium Cyanide: Egg, under 1000 lb 19.80, 1000-19,900 lb 18.80, 20,000 lb and over 17.80; granular, add 1.0 premium to above.

Sodium Stannate: Less than 100 lb 65.2; 100-600 lb 51.40; 700-1900 lb 48.9; 2000-9900 lb 47.10; 10,000 lb or more 46.

Stannous Chloride (Anhydrous): Less than 50 lb $1.497, 50 lb $1.157, 100-500 lb $1.067, 400-900 lb 98.2; 1000-1900 lb 95.8; 2000-4900 lb 92.4; 5000-19,000 lb 86; 20,000 lb and over 79.9.

Stannous Sulfate: Less than 50 lb $1.20; 50 lb 90; 100-1900 lb 88; 2000 lb and over 86.

Zinc Cyanide: Under 1000 lb 54.30, 1000 lb and over 52.30.

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	48.38b	45.98c	....	48.44	26.000	26.000	25.250
Yellow Brass	41.72	41.66	42.26	44.63	19.750	19.500	18.000
Red Brass, 85%	45.44	45.38	45.98	48.25	23.000	22.750	22.250
Low Brass, 80%	44.47	44.41	45.01	47.28	22.125	21.875	21.375
Naval Brass	45.76	40.07	52.80	48.92	18.250	18.000	17.500
Commercial Bronze, 90%....	46.95	46.89	47.49	49.51	23.875	23.625	23.125
Nickel Silver, 10%	55.36	59.43g	57.69	....	23.625	23.375	11.813
Phosphor Bronze, A, 5%....	66.58	67.08	67.08	68.23	26.125	25.875	24.875
Silicon Bronze	52.71	51.90	52.75	70.11e	25.125	24.875	24.125
Manganese Bronze	49.48	43.62	54.06	....	18.250	18.000	17.500
Muntz Metal	43.96	39.77	....	....	18.625	18.375	17.875

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 pounds, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

Nonferrous Metals

Pressure for tariff protection mounts as imports put price squeeze on domestic miners. Among most active proponents are zinc and lead producers

TARIFF TALK is being revived as imports put the price squeeze on domestic miners.

Producers of zinc and lead are the most active proponents of an increased levy on metal coming in from abroad. After zinc price was cut a half-cent on Sept. 11 to 10 cents, E. St. Louis, the metal was at its lowest point in three and a half years.

Lead is in a similar but less precarious position. Pegged at 14 cents on July 23 after a climb from the year's low of 12 cents on Apr. 20, lead succumbed last week to heavier offerings of metal abroad and reduced buying. The price slipped a half-cent to 13.50, New York basis, in a custom smelter initiated move. High for the year in lead was the 14.75-cent level on Jan. 2.

Protectionists—A number of industries are supporting, overtly or covertly, various appeals for tariff protection. Fear of competition from foreign materials or goods is a normal accompaniment of the evening up of prices and demand. Effects of the stock market slide are of psychological importance.

Latest tariff proposal came from the National Lead and Zinc Committee, which seeks relief under escape clause provisions of the Trade Agreements Extension Act. The group, headed by Otto Herres, vice president, Combined Metals Reduction Co., wants a 50 per cent increase in duties over those prevailing at the beginning of 1945, before reciprocal trade agreements came into effect.

Quotas Too—The petition filed with the Tariff Commission also suggests import quotas be established—350,000 tons of lead and 300,000 tons of zinc, in metallic content. With these measures enacted, an annual U. S. mine production of 700,000 tons of zinc and 400,000 tons of lead is believed possible. The committee proposed that if the price of either climbed beyond 15 cents the import quotas be suspended.

Duty on slab zinc would be boosted to 2.1 cents a pound from the present 0.7, zinc ore and concentrates would have a duty of 1.8 cents, compared with the present 1.0625, and on ore the rate would be 1.8 cents, as against 0.75 cent now in effect.

Sliding Scale — The hotly-debated sliding scale tax proposed in Congress earlier this year may get another look, too. Andrew Fletcher, president of St. Joseph Lead Co. and American Institute of Mining and Metallurgical Engineers, said the plan fundamentally seems "to be the best one for consumers and miners," and "it would not be too difficult to work out details as to what was a proper price basis." Zinc imports this year are running about 75 per cent over the 1952 rate.

Other metals could face the same problem. Some steel men are worrying aloud about incoming shipments. Brass mills are in trouble moving some products because of volume imports, especially in free cutting brass rods used for screw machine parts. Copper men note the sizable tonnages sold here in days of shortage and while Chile is out of the market. They may grow in importance as the market slips.

No Overproduction — One example can be found in a letter to stockholders of Copper Range Co. President Morris W. LaCroix said that while there is no apparent overproduction of copper and its products in this country his company had to meet "effective and direct" competition from foreign copper and products of foreign rolling mills.

In Washington hearings before the Committee for Reciprocity Information, U. S. industries ranging from common pins to garlic powder sought to impress their views on government representatives attending the Geneva meeting of the General Agreement on Tariffs and Trade. Under present rules, members of that Agreement will be free after Jan. 1, 1954, to withdraw individual tariff concessions without canceling a whole agreement. A number of participants seek to push this date back on grounds a big increase in tariffs in practically all markets of the world would result.

Trading Remains Quiet

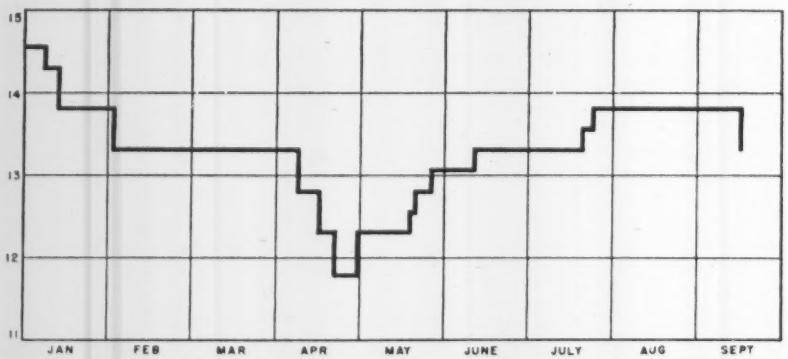
Trading of nonferrous metals remains quiet outside of lead and zinc, where price changes cause abnormalities. Copper men are waiting for the drawn-out negotiations on Chilean copper to conclude. Aluminum sellers note a falling off in demand for some manufactured products, chiefly screw machine stock, ACSR transmission cable and farm building products. The biggest tonnage item, sheet, is selling well on forward orders and foil business has improved remarkably. Tin prices slipped several cents in the week, with prompt winding up about 81 cents.

Showcase of Ideas

Dedicated in Pittsburgh last week was a showcase of ideas for aluminum in the building industry. The 30-floor Alcoa building, lightest structure for its size ever built, was completed in a little over three years. Among the building innovations claimed are exterior walls of 6 x 12-foot aluminum panels and reversible aluminum window frames. Ceilings, wiring, lighting, partition framing, rooftop cooling tower, interior trim, elevator cabs and most of the plumbing are made of the light metal. Architects take note.

LEAD SINKS AGAIN

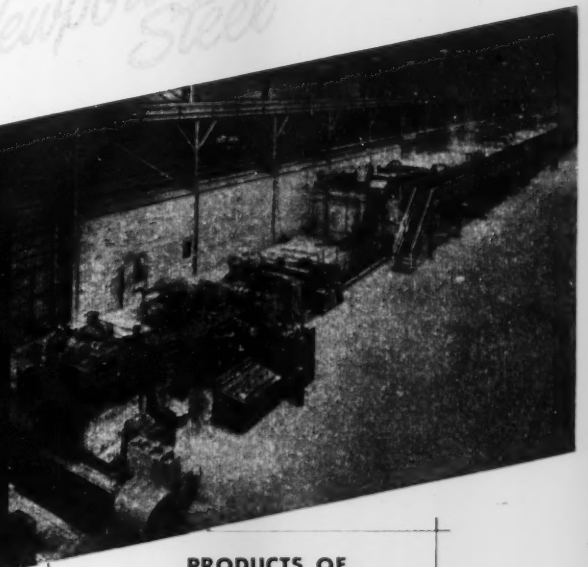
1953 Prices in Cents Per Pound, Common Grade, St. Louis



CONTINUOUS PICKLING UNIT

added at

Newport Steel



The first new facility completed this year in Newport's program of progress is a $3,000,000 continuous pickling line. Customers now may secure still another high-quality end-product in the form of hot-rolled pickled steel in coil from Newport's unique reversing hot mill, which started rolling in 1949. Other additions include electric furnaces, another soaking pit, electric weld pipe mill, and river barge loading facilities. These modern improvements plus 68 years of steelmaking experience make Newport an increasingly dependable source for your volume requirements.

PRODUCTS OF NEWPORT STEEL

- Hot-Rolled Steel in Coil
- Hot-Rolled Pickled Steel in Coil
- Electric Weld Line Pipe
- Hot-Rolled Sheets
- Galvanized Sheets
- Galvannealed Sheets
- Colorbond Sheets
- Hot-Rolled Pickled Sheets
- Electrical Sheets
- Alloy Sheets
- Roofing and Siding
- Eave Trough and Conductor Pipe
- Culverts

Newport Steel

CORPORATION

NEWPORT, KENTUCKY

ECONOMICAL WATERAIL DELIVERY

STEEL PRICES

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Changes shown in italics.
Code numbers following mill points indicate producing company, key on page 205. Key to footnotes, page 207

—SEMIFINISHED—

INGOTS, Carbon, Forging (NT)
Fontana,Calif, K1 ....$86.00
Munhall,Pa. U5 ....59.00

INGOTS, Alloy (NT)
Detroit R7 ....$63.00
Fontana,Calif. K1 ....88.00
Midland,Pa. C18 ....62.00
Munhall,Pa. U5 ....62.00

BILLETS, BLOOMS & SLABS
Carbon Rerolling (NT)
Aliquippa,Pa. J5 ....$62.50
Bessemer,Pa. U5 ....62.00
Clairton,Pa. U5 ....62.00
Ensley,Ala. T2 ....62.00
Fairfield,Ala. T2 ....62.00
Fontana,Calif. K1 ....81.00
Gary,Ind. U5 ....62.00
Johnstown,Pa. B2 ....62.00
Lackawanna,N.Y. B2 ....62.00
Munhall,Pa. U5 ....62.00
So.Chicago,Ill. U5 ....62.00
So.Duquesne,Pa. U5 ....62.00

Carbon, Forging (NT)
Aliquippa,Pa. J5 ....$75.50
Bessemer,Pa. U5 ....75.50
Buffalo R2 ....75.50
Canton,O. R2 ....75.50
Clairton,Pa. U5 ....75.50
Cleveland R2 ....75.50
Conshohocken,Pa. A3 ..82.50
Detroit R7 ....78.50
Ensley,Ala. T2 ....75.50
Fairfield,Ala. T2 ....75.50
Fontana,Calif. K1 ....94.50
Gary,Ind. U5 ....75.50
Geneva,Utah C11 ....75.50
Houston S5 ....85.50
Johnstown,Pa. B2 ....75.50
Lackawanna,N.Y. B2 ..75.50
LosAngeles B3 ....94.50
Munhall, Pa. U5 ....75.50
Seattle B3 ....94.50
So.Chicago R2,U5,W14 ..75.50
So.Duquesne,Pa. U5 ..75.50
So.SanFrancisco B3 ....94.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$82.00
Buffalo R2 ....82.00
Canton,O. R2 ....82.00
Canton,O. T7 ....84.60
Conshohocken,Pa. A3 ..89.00
Detroit R7 ....84.00
Fontana,Calif. K1 ....101.00
Gary,Ind. U5 ....82.00
Houston S5 ....92.00
Ind Harbor,Ind. Y1 ..82.00
Johnstown,Pa. B2 ....82.00
Lackawanna,N.Y. B2 ..82.00
LosAngeles B3 ....102.00
Massillon,O. R2 ....82.00
Midland,Pa. C18 ....82.00
Munhall,Pa. U5 ....82.00
So.Chicago R2,U5,W14 82.00
So.Duquesne,Pa. U5 ..82.00
Struthers,O. Y1 ....82.00
Warren,O. C17 ....82.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ....$92.50
Canton,O. R2 ....92.50
Cleveland R2 ....92.50
Fontana,Calif. K1 ..113.50
Gary,Ind. U5 ....92.50
Massillon,O. R2 ....92.50
So.Chicago,Ill. R2 ....92.50
So.Duquesne,Pa. U5 ..92.50

SHEET BAR (NT)
Fontana,Calif. K1 ....$93.18

SKELP
Aliquippa,Pa. J5 ....3.85
Munhall,Pa. U5 ....3.75
Warren,O. R2 ....3.75
Youngstown R2, U5 ..3.75

WIRE RODS
AlabamaCity,Ala. R2 ..4.525
Aliquippa,Pa. J5 ....4.525
Alton,Ill. L1 ....4.70
Buffalo W12 ....4.525
Cleveland A7 ....4.525
Donora,Pa. A7 ....4.525
Fairfield,Ala. T2 ....4.525
Fontana,Calif. K1 ....5.325
Houston S5 ....4.925
Johnstown,Pa. B2 ....4.525
Joliet,Ill. A7 ....4.525
KansasCity,Mo. S5 ....4.865
LosAngeles B3 ....5.325
Minnequa,Colo. C10 ....4.775
Monessen,Pa. P7 ....4.725
No.Tonawanda,N.Y. B11 4.525
Pittsburg,Calif. C11 ..5.175
Portsmouth P12 ....4.525
Roebling,N.J. R5 ....4.625
So.Chicago,Ill. R2 ....4.525
SparrowsPoint,Md. B2 ..4.625
Sterling,Ill.(1) N15 ....4.525
Struthers,O. Y1 ....4.525
Torrance,Calif. C11 ....5.325
Worcester,Mass. A7 ....4.825

—STRUCTURALS—

Carbon Steel Stand. Shapes
AlabamaCity, Ala. R2 ..4.10
Aliquippa,Pa. J5 ....4.10
Bessemer,Ala. T2 ....4.10
Bethlehem,Pa. B2 ....4.15
Clairton,Pa. U5 ....4.10
Fairfield,Ala. T2 ....4.10
Fontana,Calif. K1 ....4.75
Gary,Ind. U5 ....4.10
Geneva,Utah C11 ....4.10
Houston S5 ....4.60
Ind.Harbor,Ind I-2 ....4.10
Johnstown,Pa. B2 ....4.15
KansasCity,Mo. S5 ....4.80
Lackawanna,N.Y. B2 ....4.15
LosAngeles B3 ....4.80
Minnequa, Colo. C10 ....4.55
Munhall,Pa. U5 ....4.10
Niles,Calif.(22) P1 ....4.91
Phoenixville,Pa. P4 ....4.95
Seattle B3 ....4.85
So.Chicago,Ill. U5, W14 4.10
So.SanFrancisco B3 ....4.75
Torrance,Calif. C11 ....4.80
Weirton,W.Va. W6 ....4.35

Wide Flange
Bethlehem,Pa. B2 ....4.15
Clairton,Pa. U5 ....4.10
Fontana,Calif. K1 ....5.30
Lackawanna,N.Y. B2 ..4.15
Munhall,Pa. U5 ....4.10
So.Chicago,Ill. U5 ....4.10

Alloy Stand. Shapes
Clairton,Pa. U5 ....5.00
Fontana,Calif. K1 ....6.40
Gary,Ind. U5 ....5.00
Munhall,Pa. U5 ....5.00
So.Chicago,Ill. U5 ....5.00

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 ....6.175
Bessemer, Ala. T2 ....6.175
Bethlehem,Pa. B2 ....6.20
Clairton,Pa. U5 ....6.175
Fairfield,Ala. T2 ....6.175
Fontana,Calif. K1 ....6.825
Gary,Ind. U5 ....6.175
Geneva,Utah C11 ....6.175
Ind.Harbor,Ind. I-2 ..6.175
Ind.Harbor,Ind. Y1 ..6.675
Johnstown,Pa. B2 ....6.20
Lackawanna,N.Y. B2 ..6.20
LosAngeles B3 ....6.85
Munhall,Pa. U5 ....6.175
Seattle B3 ....6.90
So.Chicago,Ill U5, W14 6.175
So.SanFrancisco B3 ....6.80
Struthers,O. Y1 ....6.675

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 ....6.20
Lackawanna,N.Y. B2 ..6.20
Munhall,Pa. U5 ....6.125
So.Chicago,Ill. U5 ....6.125

BEARING PILES
Munhall,Pa. U5 ....4.10
So.Chicago,Ill. U5 ....4.10

—PILING—

STEEL SHEET PILING
Ind Harbor,Ind I-2 ....4.925
Lackawanna,N.Y. B2 ..4.925
Munhall,Pa. U5 ....4.925
So.Chicago,Ill. U5 ....4.925

—PLATES—

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..4.10
Aliquippa,Pa. J5 ....4.10
Ashland,Ky. (15) A10 ..4.10
Bessemer,Ala. T2 ....4.10
Clairton,Pa. U5 ....4.10
Claymont,Del. C22 ....4.55
Cleveland J5, R2 ....4.10
Coatesville,Pa. L7 ....4.35
Conshohocken,Pa. A3 ..4.55
Ecorse,Mich. G5 ....4.65
Fairfield,Ala. T2 ....4.10
Fontana,Calif.(30) K1 ..4.75
Gary,Ind. U5 ....4.10
Geneva,Utah C11 ....4.10
GraniteCity,Ill. G4 ....4.60
Harrisburg,Pa. C8 ....4.95
Houston S5 ....4.60
Ind Harbor,Ind. I-2, Y1 4.10
Johnstown,Pa. B2 ....4.10
Lackawanna,N.Y. B2 ..4.10
Minnequa,Colo. C10 ....4.95
Munhall,Pa. U5 ....4.10
Pittsburgh J5 ....4.10
Riverdale,Ill. A1 ....4.10
Seattle B3 ....5.00
Sharon,Pa. S3 ....4.10
So.Chicago,Ill. U5, W14 4.10
SparrowsPoint,Md. B2 ..4.10
Steubenville,O. W10 ....4.10
Warren,O. R2 ....4.10
Weirton, W.Va. W6 ....4.40
Youngstown R2, U5, Y1 4.10

PLATES, Carbon A.R.
Fontana,Calif. K1 ....5.90
Geneva,Utah C11 ....5.25

PLATES, Wrought Iron
Economy,Pa. B14 ....9.30

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 ....6.25
Bessemer,Ala. T2 ....6.25
Clairton,Pa. U5 ....6.25
Cleveland J5 ....6.25
Conshohocken,Pa. A3 ..6.50
Ecorse,Mich. G5 ....7.10
Fairfield,Ala. T2 ....6.25
Fontana,Calif.(30) K1 ..6.95
Gary, Ind. U5 ....6.25
Geneva,Utah C11 ....6.25
Ind.Harbor,Ind. I-2 ..6.25
Ind.Harbor,Ind. Y1 ....6.75
Johnstown,Pa. B2 ....6.25
Lackawanna,N.Y. B2 ..6.25
Munhall,Pa. U5 ....6.25
Pittsburgh J5 ....6.25
Seattle B3 ....7.15
Sharon,Pa. S3 ....6.25
So. Chicago,Ill. U5, W14 6.25
SparrowsPoint,Md. B2 ..6.25
Youngstown U5 ....6.25
Youngstown Y1 ....6.75

PLATES, Alloy
Claymont,Del. C22 ....5.65
Coatesville,Pa. L7 ....5.75
Fontana,Calif. K1 ....6.60
Gary,Ind. U5 ....5.55
Johnstown,Pa. B2 ....5.55
Munhall,Pa. U5 ....5.55
Sharon,Pa. S3 ....5.70
So.Chicago,Ill. U5, W14 5.55
SparrowsPoint,Md. B2 ..5.55

FLOOR PLATES
Cleveland J5 ....5.15
Conshohocken,Pa. A3 ..5.15
Ind. Harbor,Ind. I-2 ....5.15
Munhall,Pa. U5 ....5.15
So.Chicago,Ill. U5 ....5.15

PLATES, Ingot Iron
Ashland,c.l. (15) A10 ..4.35
Ashland,l.c.l. (15) A10..4.85
Cleveland, c.l. R2 ....4.70
Warren,O. c.l. R2 ....4.70

—BARS—

BARS, Hot-Rolled Carbon
AlabamaCity, Ala. R2 ..4.15
Aliquippa,Pa. J5 ....4.15
Alton,Ill. L1 ....4.50
Atlanta,Ga. A11 ....4.40
Bessemer,Ala. T2 ....4.15
Buffalo R2 ....4.15
Canton,O. R2 ....4.15
Clairton,Pa. U5 ....4.15
Cleveland R2 ....4.15
Detroit R7 ....4.30
Ecorse,Mich. G5 ....4.60
Emeryville,Calif. J7 ....4.90
Fairfield,Ala. T2 ....4.15
Fontana,Calif. K1 ....4.85
Gary,Ind. U5 ....4.15
Houston S5 ....4.65
Ind.Harbor,Ind. I-2, Y1 4.15
Johnstown,Pa. B2 ....4.15
KansasCity,Mo. S5 ....4.85
Lackawanna,N.Y. B2 ..4.15
LosAngeles B3 ....4.85
Midland,Pa. C18 ....4.85
Milton,Pa. B6 ....4.55
Minnequa,Colo. C10 ....4.75
Niles,Calif. P1 ....4.85
Pittsburg,Calif. C11 ....4.85
Pittsburgh J5 ....4.15
SandSprings,Okla. S5 ..5.05
Seattle B3, N14 ....4.90
So.Chicago,Ill. R2 ....4.15
So.Duquesne,Pa. U5 ....4.15
So.SanFrancisco B3 ....4.90
SparrowsPoint,Md. B2 ..4.15
Sterling,Ill. (1) N15 ....4.15
Struthers,O. Y1 ....4.15
Torrance,Calif. C11 ....4.85
Youngstown R2, U5 ....4.15

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ....4.875
Buffalo R2 ....4.875
Canton,O. T7 ....5.02
Canton,O. R2 ....4.875
Clairton,Pa. U5 ....4.875
Detroit R7 ....4.975
Ecorse,Mich. G5 ....5.225
Fontana,Calif. K1 ....5.925
Gary,Ind. U5 ....4.875
Houston S5 ....5.375
Ind.Harbor,Ind. I-2, Y1 4.875
Johnstown,Pa. B2 ....4.875
KansasCity,Mo. S5 ....5.575
Lackawanna,N.Y. B2..4.875
LosAngeles B3 ....5.925
Massillon,O. R2 ....4.875
Midland,Pa. C18 ....4.875
So.Chicago R2, U5,W14 4.875
So.Duquesne,Pa. U5 ..4.875
Struthers,O. Y1 ....4.875
Warren,O. C17 ....4.875
Youngstown U5 ....4.875

BARS & SMALL SHAPES, H.R.
High-Strength Low-Alloy
Aliquippa,Pa. J5 ....6.225
Bessemer,Ala. T2 ....6.225
Bethlehem,Pa. B2 ....6.225
Clairton,Pa. U5 ....6.225
Ecorse,Mich. G5 ....6.875
Fairfield,Ala. T2 ....6.225
Fontana,Calif. K1 ....7.475
Gary,Ind. U5 ....6.225
Ind Harb.,Ind. Y1 ....6.725
Ind Harb., Ind I-2 ....6.225
Johnstown,Pa. B2 ....6.225
Lackawanna,N.Y. B2 ..6.225
LosAngeles B3 ....6.925
Pittsburgh J5 ....6.225
Seattle B3 ....6.975
So.Chicago W14 ....6.225
So.Duquesne,Pa. U5 ..6.225
So.SanFrancisco B3 ..6.975
Struthers,O. Y1 ....6.725
Youngstown U5 ....6.225

BAR SIZE ANGLES;H.R.CARBON
Bethlehem,Pa. B2 ....4.35

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 ....4.15
Atlanta A11 ....4.40
Niles,Calif. P1 ....4.85
SanFrancisco S7 ....5.10

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 ....5.00
Fontana,Calif. K1 ....6.00
Gary,Ind. U5 ....5.00
Houston S5 ....5.70
KansasCity S5 ....5.90
Youngstown U5 ....5.00

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....5.20
BeaverFalls,Pa. M12, R2 5.20
Buffalo B5 ....5.20
Camden,N.J. P13 ....5.65
Carnegie,Pa. C12 ....5.20
Chicago W18 ....5.20
Cleveland A7, C20 ....5.20
Detroit P17, R7 ....5.35
Detroit B5 ....5.40
Donora,Pa. A7 ....5.20
Elyria,O. W8 ....5.20
FranklinPark,Ill. N5 ....5.20
Gary,Ind R2 ....5.20
GreenBay,Wis. F7 ....5.15
Hammond,Ind. L2, M13 5.20
Hartford,Conn. R2 ....5.75
Harvey,Ill. B5 ....5.20
LosAngeles R2 ....6.65
Mansfield Mass. B5 ....5.75
Massillon,O. R2, R8 ....5.20
Monaca,Pa. S17 ....5.20
Newark,N.J. W18 ....5.65
NewCastle,Pa. (17) B4 ..5.20
Pittsburgh J5 ....5.20
Plymouth,Mich. P5 ....5.45
Putnam,Conn. W18 ....5.75
Readville,Mass. C14 ....5.75
St.Louis,Mo. M5 ....5.50
So.Chicago,Ill. W14 ....5.20
SpringCity,Pa. K3 ....5.65
Struthers,O. Y1 ....5.20
Waukegan,Ill. A7 ....5.20
Worcester,Mass. W19 ..6.10
Youngstown F3, Y1 ....5.20

BARS, Cold-Finished Carbon
(Turned and Ground)
Cumberland,Md. (5) C19..4.45

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....6.325
BeaverFalls,Pa. M12 ..6.325
Bethlehem,Pa. B2 ....6.325
Buffalo B5 ....6.325
Camden,N.J. P13 ....6.50
Canton,O. R2 ....6.325
Canton,O. T7 ....6.29
Carnegie,Pa. C12 ....6.00
Chicago W18 ....6.325
Cleveland A7, C20 ....6.325
Detroit P7 ....6.475
Detroit P17 ....6.475
Detroit B5 ....6.525
Donora,Pa. A7 ....6.325
Elyria,O. W8 ....6.325
Gary,Ind. R2 ....6.325
Hammond,Ind. L2, M13..6.325
Hartford,Conn. R2 ....6.775
Harvey,Ill. B5 ....6.325
Lackawanna,N.Y. B2 ..6.325
Mansfield,Mass. B5 ...6.775
Massillon,O. R2, R8 ..6.325
Midland,Pa. C18 ....6.325
Monaca,Pa. S17 ....6.325
Newark,N.J. W18 ....6.65
Plymouth,Mich. P5 ....6.525
So.Chicago,Ill. R2, W14 6.325
SpringCity,Pa. K3 ....6.475
Struthers,O. Y1 ....6.325
Warren,O. C17 ....6.325
Waukegan,Ill. A7 ....6.325
Worcester,Mass. A7 ..6.625
Youngstown F3, Y1 ...6.325

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ..4.15
Atlanta A11 ....4.40
Buffalo R2 ....4.15
Cleveland R2 ....4.15
Emeryville,Calif. J7 ....4.90
Fairfield,Ala. T2 ....4.15
Fontana,Calif. K1 ....4.85
Gary,Ind. U5 ....4.15
Houston S5 ....4.65
Ind.Harbor,Ind. I-2, Y1 4.15
Johnstown,Pa. B2 ....4.15
KansasCity,Mo. S5 ....4.85
Lackawanna,N.Y. B2 ...4.15
LosAngeles B3 ....4.85
Milton,Pa. B6 ....4.55
Minnequa,Colo. C10 ....4.75
Niles,Calif. P1 ....4.85
Pittsburg,Calif. C11 ....4.85
Pittsburgh J5 ....4.15
SandSprings,Okla. S5 ..5.05
Seattle B3, N14 ....4.90
So.Chicago,Ill. R2 ....4.15
So.Duquesne,Pa. U5 ....4.15
So.SanFrancisco B3 ....4.90
SparrowsPoint,Md. B2 ..4.15
Sterling,Ill. (1) N15 ....4.15
Struthers,O. Y1 ....4.15
Torrance,Calif. C11 ....4.85
Youngstown R2, U5 ....4.15

BARS, Reinforcing
(Fabricated; to consumers)
Johnstown, ¼-1" B2 ....5.55
KansasCity S5 ....6.35
LosAngeles B3 ....6.18
Marion,O. P11 ....5.55
Seattle N14 ....5.80
Seattle B3 ....6.25
So.SanFrancisco B3 ....6.25
SparrowsPt. ¼-1" B2 ..5.55
Williamsport,Pa. S19 ...5.45

RAIL STEEL BARS
Avis,Pa.(4) J8 ....4.75
ChicagoHts.(3) C2 ....4.50
ChicagoHts.(4) C2 ....4.75
ChicagoHts.(3.4) I-2 ..4.50
FortWorth,Tex.(26) T4..4.65
Franklin,Pa.(3) F5 ....4.50
Franklin,Pa.(4) F5 ....4.75
Marion,O.(3) P11 ....4.50
Moline,Ill.(3) R2 ....4.50
Tonawanda(3.4) B12 ....5.00
Williamsport,Pa.(3) S19..5.25
Williamsport,Pa.(4) S19..5.45

BARS, Wrought Iron
Economy,Pa.(S.R.) B14..10.40
Economy,Pa.(D.R.)B14 12.90
Economy(Staybolt) B14 13.20
McK.Rks.(Staybolt) L5 15.50
McK.Rks.(S.R.) L5 ....10.40
McK.Rks.(D.R.) L5 ....14.00

—SHEETS—

SHEETS, Hot-Rolled Steel
(18 gage and heavier)
AlabamaCity,Ala. R2 ..3.925
Ashland,Ky.(8) A10 ..3.925
Butler,Pa. A10 ....3.925
Cleveland J5, R2 ....3.925
Conshohocken,Pa. A3 ....4.05
Detroit M1 ....4.40
Ecorse,Mich. G5 ....4.125
Fairfield,Ala. T2 ....3.925
Fairless,Pa. U5 ....4.025
Fontana,Calif. K1 ....4.70
Gary,Ind. U5 ....3.925
Geneva,Utah C11 ....4.025
GraniteCity,Ill. G4 ....4.30
Ind.Harbor,Ind. I-2, Y1 3.925
Irvin,Pa. U5 ....3.925
Lackawanna,N.Y. B2..3.925
Munhall,Pa. U5 ....3.925

Niles,O. N12 .....5.425
Pittsburg,Calif. C11 ..4.625
Pittsburgh J5 .....3.925
Riverdale,Ill. A1 .....3.925
Sharon,Pa. S3 .....4.225
So.Chicago,Ill. W14 ...3.925
SparrowsPoint,Md. B2..3.925
Steubenville,O. W10 ..3.925
Torrance,Calif. C11 ..4.625
Warren,O. R2 .....3.925
Weirton,W.Va. W6 ...3.925
Youngstown U5, Y1 ..3.925

SHEETS, H.R. (19 gage)

AlabamaCity,Ala. R2 ..5.225
Dover,O. R1 .....5.975
Mansfield,O. E6 .....5.80
Niles,O. N12 .....5.20
Torrance,Calif. C11 ..5.875

SHEETS, H.R. (14 ga. heavier) High-Strength Low-Alloy

Cleveland J5, R2 ....5.90
Conshohocken,Pa. A3 ..6.15
Ecorse,Mich. G5 .....6.375
Fairfield,Ala. T2 .....5.90
Fontana,Calif. K1 ....7.00
Gary,Ind. U5 .....5.90
Ind.Harbor,Ind. I-2 ....5.90
Ind.Harbor,Ind. Y1 ....6.40
Irvin,Pa. U5 .....5.90
Lackawanna(35) B2 ...5.90
Munhall,Pa. U5 .....5.90
Pittsburgh J5 .....5.90
Sharon,Pa. S3 .....5.90
So.Chicago,Ill. U5 ....5.90
SparrowsPoint(38) B2 .5.90
Warren,O. R2 .....5.90
Weirton,W.Va. W6 ....6.175
Youngstown U5 .....5.90
Youngstown Y1 .....6.40

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..4.175
Cleveland R2 .....4.525
Ind. Harbor,Ind. I-2 ..4.175
Warren,O. R2 .....4.525

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10 .....4.775
Cleveland J5, R2 .....4.775
Ecorse,Mich. G5 .....4.975
Fairfield,Ala. T2 .....4.775
Fairless,Pa. U5 .....4.875
Follansbee,W.Va. F4 ..5.775
Fontana,Calif. K1 ....5.875
Gary,Ind. U5 .....4.775
GraniteCity,Ill. G4 ....5.275
Ind.Harbor,Ind. I-2,Y1 4.775
Irvin,Pa. U5 .....4.775
Lackawanna,N.Y. B2 ..4.775
Middletown,O. A10 ....4.775
Pittsburg,Calif. C11 ..5.725
Pittsburgh J5 .....4.775
SparrowsPoint,Md. B2..4.775
Steubenville,O. W10 ...4.775
Warren,O. R2 .....4.775
Weirton,W.Va. W6 ...4.775
Youngstown Y1 .....4.775

SHEETS, Cold-Rolled High-Strength Low-Alloy

Cleveland J5, R2 .....7.225
Ecorse,Mich. G5 .....7.675
Fontana,Calif. K1 ....8.275
Gary,Ind. U5 .....7.225
IndianaHarbor,Ind. Y1 .7.725
Irvin,Pa. U5 .....7.225
Lackawanna(37) B2 ..7.225
Pittsburgh J5 .....7.225
SparrowsPoint (38) B2 7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.475
Youngstown Y1 .....7.725

SHEETS, Cold-Rolled Ingot Iron

Butler,Pa. A10 .....5.275
Cleveland R2 .....5.375
Middletown,O. A10 ....5.275
Warren,O. R2 .....5.375

SHEETS, Gal'd No. 10 Steel

AlabamaCity,Ala. R2 ..5.275
Ashland,Ky. (8) A10 ..5.275
Canton,O. R2 .....5.275
Dover,O. R1 .....5.675
Fairfield,Ala. T2 ....5.275†
Gary,Ind. U5 .....5.275†
GraniteCity,Ill. G4 ....5.475
Ind.Harbor,Ind. I-2 ..5.325
Irvin,Pa. U5 .....5.275†
Kokomo,Ind.(13) C16..5.375
MartinsFerry,O. W10 ..5.275
Niles,O. N12 .....5.80
Pittsburg,Calif. C11 ..6.025†
Sharon,Pa. S3 .....5.45
SparrowsPoint,Md. B2 5.275
Steubenville,O. W10 ..5.275
Torrance,Calif. C11 ..6.275†
Weirton,W.Va. W6 ....5.275

†Based on 5c zinc.

SHEETS, Galvanized No. 10 High-Strength Low-Alloy

Irvin,Pa. U5 .....7.925
SparrowsPoint(39) B2 .8.075

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10 ..5.525
Canton,O. R2 .....6.025

SHEETS, Culvert	Cu Alloy	Cu Fe
Ashland,Ky. A10	6.325	....
Canton,O. R2	6.475	6.925
Fairfield T2	6.075	6.325
Gary,Ind. U5	6.075	6.325
Ind.Harbor I-2	6.075	6.325
Irvin,Pa. U5	6.075	6.325
Kokomo,Ind C16	6.525	....
MartinsFry.,O.W10	6.075	....
Pitts.,Cal. C11	6.825	....
SparrowsPt. B2	6.075	....
Torrance,Calif.C11	6.825	....

SHEETS, Culvert	Pure Iron
Ashland,Ky. A10	6.575
Fairfield,Ala. T2	6.325
MartinsFerry,O. W10	6.325

SHEETS, Galvannealed Steel

Canton,O. R2 .....5.825
Irvin,Pa. U5 .....5.825†
Kokomo,Ind.(13) C16 ..5.925
Niles,O. N12 .....6.35

†Based on 5c zinc

SHEETS, ZINCGRIP Steel

Butler,Pa. A10 .....5.525
Middletown,O. A10 ....5.525

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10 .....5.775
Middletown,O. A10 ....5.775

SHEETS, Electrogalvanized

Cleveland R2 (28) 6.125
Niles,O. R2 (28) 6.125
Weirton,W.Va. W6 ....5.975

SHEETS, ALUMINIZED

Butler,Pa. A10 .....8.625

SHEETS, Enameling Iron

Ashland,Ky.(8) A10 ...5.175
Cleveland R2 .....5.175
Gary,Ind. U5 .....5.175
GraniteCity,Ill. G4 ...5.875
Ind.Harbor,Ind. I-2 ...5.175
Irvin,Pa. U5 .....5.175
Middletown,O. A10 ....5.175
Youngstown Y1 .....5.175

BLUED STOCK, 29 ga.

Yorkville,O. W10 .....7.20
Follansbee,W.Va. F4 ....7.30
Follansbee (23) F4 ..7.175

SHEETS, Long Terne Steel (Commercial Quality)

BeechBott'm,W.Va.W10 5.675
Gary,Ind. U5 .....5.675
Mansfield,O. E6 .....6.25
Middletown,O. A10 ....5.675
Niles,O. N12 .....6.00
Weirton,W.Va. W6 ....5.675

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....6.075

SHEETS, Well Casing

Fontana,Calif. K1 .....6.20

—STRIP—

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ..3.925
Alton,Ill. L1 .....4.20
Ashland,Ky.(8) A10 ...3.925
Atlanta A11 .....4.175
Bessemer,Ala. T2 .....3.925
Bridgeport,Con.(10)S15 4.425
Buffalo (27) R2 .....3.925
Butler,Pa. (8) A10 ...3.925
Carnegie,Pa. S18 ....4.425
Conshohocken,Pa. A3 4.05
Detroit M1 .....4.40
Ecorse,Mich. G5 .....4.225
Fairfield,Ala. T2 .....3.925
Fontana,Calif. K1 .....4.70
Gary,Ind. U5 .....3.925
Houston,Tex. S5 .....4.425
Ind.Harbor,Ind. I-2,Y1 3.925
Johnstown,Pa.(25) B2..3.925
KansasCity,Mo.(9) S5..4.625
Lackawanna,N.Y.(32) B2 3.925
LosAngeles(25) B3 ....4.675
Milton,Pa. B6 .....4.35
Minnequa,Colo. C10 ...5.025
NewBritain(10) S15 ...4.425
N.Tonawanda,N.Y. B11..3.925
Pittsburg,Calif. C11 ..4.675
Riverdale,Ill. A1 .....3.925
SanFrancisco S7 .....5.10
Seattle(25) B3 .....4.925
Seattle N14 .....4.925
Sharon,Pa. S3 .....4.225
So.Chicago,Ill. W14 ....3.925
So.SanFrancisco(25)B3 4.675
SparrowsPoint,Md. B2..3.925
Torrance,Calif. C11 ...4.675
Warren,O. R2 .....3.925
Weirton,W.Va. W6 ....4.025
Youngstown Y1, U5 ..3.925

STRIP, Hot-Rolled Alloy

Bridgeport,Conn.(10)S15 6.45
Carnegie,Pa. S18 .....6.45
Fontana,Calif. K1 .....7.80
Gary,Ind. U5 .....6.40
Houston,Tex. S5 .....6.90
KansasCity,Mo. S5 ....7.10
LosAngeles B3 .....7.60
NewBritn.,Conn.(10)S15 6.45
Sharon,Pa. S3 .....6.45
So.Chicago W14 .....6.40
Youngstown U5 .....6.40

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2 ....5.65
Conshohocken,Pa. A3 ..6.20
Ecorse,Mich. G5 .....6.50
Fairfield,Ala. T2 .....5.65
Fontana,Calif. K1 .....7.05
Gary,Ind. U5 .....5.95
Ind.Harbor,Ind. I-2 ....5.95
Ind.Harbor,Ind. Y1 ....6.45
Lackawanna,N.Y. B2 ..6.00
LosAngeles(25) B3 ....6.40
Seattle(25) B3 .....6.65
Sharon,Pa. S3 .....5.95
So.SanFrancisco(25)B3 .6.40
SparrowsPoint,Md. B2 .6.00
Warren,O. R2 .....5.95
Weirton,W.Va. W6 ....6.30
Youngstown Y1 .....6.45
Youngstown U5 .....5.95

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ...4.175
Warren,O. 4.525

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....5.80
Bridgeprt.Conn.(10) S15..6.15
Butler,Pa. A10 .....5.45
Cleveland A7, J5 .....5.45
Dearborn,Mich. D3 ....6.05
Detroit D2 .....5.95
Detroit M1 .....5.45
Dover,O. G6 .....5.80
Ecorse,Mich. G5 .....5.65
Follansbee,W.Va. F4 ...5.45
Fontana,Calif. K1 .....7.35
FranklinPark,Ill.(40) T6 5.70
Ind.Harbor,Ind. I-2 ....5.70
Lackawanna,N.Y. B2 ..5.45
LosAngeles C1 .....7.50
Mattapan,Mass. T6 ....6.30
Middletown,O. A10 ....5.45
NewBritain(10) S15 ....6.15
NewCastle,Pa.(14) B4 ...5.45
NewCastle,Pa. E5 ....5.95
NewHaven,Conn. A7 ....5.95
NewHaven,Conn. D2 ...6.20
Pawtucket,R.I. R3 ....6.80
Pawtucket,R.I.(21) N8..6.65
Riverdale,Ill. (40) A1 ..5.70
Rome,N.Y.(29) R6 ....5.45
Sharon,Pa. S3 .....5.80
SparrowsPoint,Md. B2 ..5.45
Trenton,N.J. R5 .....7.00
Wallford,Conn. W2(50) 6.40
Warren,O.(40) T5 .....5.95
Warren,O. R2 .....5.45
Weirton,W.Va. W6 ....5.45
Worcester,Mass. W19 ...7.05
Youngstown C8 .....5.95
Youngstown Y1 .....5.45

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10)S15 12.15
Carnegie,Pa. S18 .....12.00
Cleveland A7 .....12.00
Dover,O. G6 .....12.00
Fontana,Calif. K1 ....13.65
Harrison,N.J. C18 ....12.00
NewBritn,Conn.(10)S15 12.15
Pawtucket,R.I.(11) N8..12.15
Pawtucket,R.I.(12) N8..12.45
Sharon,Pa. S3 .....12.00
Worcester,Mass. A7 ..12.30
Youngstown C8 .....12.00

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland J5 .....7.80
Cleveland A7 .....8.15
Dearborn,Mich. D3 ....7.90
Dover,O. G6 .....8.00
Ecorse,Mich. G5 .....8.50
Lackawanna,N.Y. B2 ..8.15
Sharon,Pa. S3 .....7.65
SparrowsPoint,Md. 8.15
Warren,O. R2 .....7.60
Weirton,W.Va. W6 ....8.30
Youngstown Y1 .....8.30

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....6.05

STRIP, Electrogalvanized

Dover,O. G6 .....5.70
Warren,O. T5 .....5.70
Weirton,W.Va. W6 ....5.45
Youngstown C8 .....5.95

TIGHT COOPERAGE HOOP

Atlanta A11 .....4.65
Riverdale,Ill. A1 .....4.50
Sharon,Pa. S3 .....4.55
Youngstown U5 .....4.35

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Co.
A7 American Steel & Wire
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Bonardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co. Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Div. H. K. Porter Co.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept., Wickwire Spencer Steel Division
C23 Charter Wire Products
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur D. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro-Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Co.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M16 Md. Fine & Special Wire
M17 Metal Forming Corp.

N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Nethwst.Steel Roll. Mills
N15 Northwestern S.&W.Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons,John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S25 StainlessWeldedProducts
S26 Specialty Wire Co. Inc.

T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W.Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div.,Colo.Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel
Y1 Youngstown Sheet&Tube

STRIP, Cold-Finished, Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O. C7		8.00	8.60	10.55	12.85
Bridgeport,Conn. (10) S15	6.15	8.00	8.60	10.55	12.85
Bristol,Conn. W1			8.90	10.85	
Carnegie,Pa. S18		8.00	8.60	10.55	12.85
Cleveland A7	5.45	7.65	8.60	10.55	12.85
DearbornMich. D3	6.05	8.25	8.85		
Detroit D2	6.45	7.85	8.45	10.55	
Dover,O. G6	6.05	8.00	8.60	10.55	12.85
FranklinPark,Ill. T6	5.80	7.80	8.75	10.70	
Harrison,N.J. C18			8.90	10.85	13.15
Mattapan,Mass. T6	6.30	7.95	8.90	10.85	13.15
NewBritn.,Conn.(10) S15	6.15	8.00	8.60	10.55	12.85
NewCastle,Pa. B4	5.80	8.00	8.60		
NewCastle,Pa. E5	5.95	8.00	8.60	10.55	12.85
NewHaven,Conn. D2	6.70	7.95	8.55	10.50	
NewYork W3		8.30	8.90	10.85	13.15
Pawtucket,R.I. N8:					
Cleve.orPitts.Base		8.00	8.60	10.55	12.85
Worcester,Mass.,Base	6.65	7.95	8.90	10.85	13.15
Sharon,Pa. S3		8.00	8.60	10.55	12.85
Trenton,N.J. R5		8.30	8.90	10.85	13.15
Wallingford,Conn. W2	6.65	7.95	8.90	10.85	13.15
Warren,O. T5	6.20	8.00	8.60	10.55	12.85
Weirton,W.Va. W6	5.80	8.00	8.60	10.55	12.85
Worcester,Mass. A7	5.75	7.95	8.90	10.85	13.15
Worcester,Mass. T6	6.30	7.95	8.90	10.85	13.15
Youngstown C8		8.00	8.60	10.55	12.85
Spring Steel (Tempered)					
Bristol,Conn. W1			12.50	15.00	
FranklinPark,Ill. T6			12.50	15.00	18.00
Trenton,N.J. R5			12.50	15.00	18.00
Harrison,N.J. C18			12.50	15.00	18.00
NewYork W3			12.50	15.00	18.00
Worcester,Mass. T6			12.50	15.00	18.00
Youngstown C8			12.50	15.00	18.00

SILICON STEEL

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (cut lengths ½c lower)	Armature	Electric Field	Motor	Dynamo
BeechBottom,W10 (cut lengths)		8.35	9.60	10.40
Brackenridge,Pa. A4		8.85	10.10	10.90
GraniteCity,Ill. G4 (cut lengths)		8.55	9.80	
IndianaHarbor,Ind. I-2	8.05	8.35	8.85	(31)
Mansfield,O. E6 (cut lengths)	7.55	7.85	8.35	9.60 10.40
Newport,Ky. N9 (cut lengths)		7.85	8.35	9.60 10.40
Niles,O. N12 (cut lengths)	7.55	7.85	8.35	
Vandergrift,Pa. U5		8.35	8.85	10.10 10.90
Warren,O. R2	8.05	8.35	8.85	10.10 10.90
Zanesville,O. A10		8.35	8.85	10.10 10.90

SHEETS, SILICON (22 Ga. Base) COILS (Cut Lengths ½c lower)	Transformer Grade 72	65	58	52
BeechBottom,W10 (cut lengths)	10.95	11.50	12.20	13.00
Brackenridge,Pa. A4	11.45			
Newport,Ky. N9 (cut lengths)	10.95			
Vandergrift,Pa. U5	11.45	12.00	12.70	13.50
Warren,O. R2	11.45			
Zanesville,O. A10	11.45	12.00	12.70	13.50

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)			16.05	16.55
Vandergrift, Pa. U5	14.00	14.85	15.85	16.35

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.40	$7.65	$8.05
Fairfield,Ala. T2	7.50	7.75	8.15
Fairless,Pa. U5	7.50	7.75	8.15
Gary,Ind. U5	7.40	7.65	8.05
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor,Ind. I-2, Y1	7.40	7.65	8.05
Irvin,Pa. U5	7.40	7.65	8.05
Niles,O. R2	7.40		
Pittsburg,Calif. C11	8.15	8.40	8.80
SparrowsPoint,Md. B2	7.50	7.75	8.15
Weirton,W.Va. W6	7.40	7.65	8.05
Yorkville,O. W10	7.40	7.65	8.05

TIN PLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.70	$8.95
Fairfield,Ala. T2	8.80	9.05
Fairless,Pa. U5	8.80	9.05
Gary,Ind. U5	8.70	8.95
Ind.Har.,Ind. I-2, Y1	8.70	8.95
Irvin,Pa. U5	8.70	8.95
Pitts.,Cal. C11	9.45	9.70
Sp.Pt.,Md. B2	8.80	9.05
Warren,O. R2	8.70	
Weirton,W.Va.W6	8.70	8.95
Yorkville,O. W10	8.70	8.95

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$6.50
Fairfield,Ala. T2	6.60
Fairless,Pa. U5	6.60
Gary,Ind. U5	6.50
GraniteCity,Ill. G4	6.70
Ind.Harbor,Ind. I-2,Y1	6.50
Irvin,Pa. U5	6.50
Niles,O. R2	6.50
Pittsburg,Calif. C11	7.25
SparrowsPoint,Md. B2	6.60
Warren,O. R2	6.50
Weirton,W.Va. W6	6.50
Yorkville,O. W10	6.50

HOLLOWARE ENAMELING Black Plate (29 gage)	
Follansbee,W.Va. F4	6.10
Gary,Ind. U5	6.10
GraniteCity,Ill. G4	6.30
Ind.Harbor,Ind. Y1	6.10
Irvin,Pa. U5	6.10
Yorkville,O. W10	6.55

MANUFACTURING TERNES (Special Coated)	
Fairfield,Ala. T2	$7.85
Gary,Ind. U5	7.75
Irvin,Pa. U5	7.75
Yorkville,O. W10	7.75

MANUFACTURING TERNES, 8 lb (Commercial Quality)	
Gary,Ind. U5	$9.75
Yorkville,O. W10	9.75

MANUFACTURING TERNES, LT. Coated, 6 lb	
Yorkville,O. W10	$8.65

ROOFING SHORT TERNES (8 lb Coated)	
Gary,Ind. U5	9.75

—WIRE—

WIRE, Manufacturers Bright, Low Carbon	
AlabamaCity,Ala. R2	5.525
Aliquippa,Pa. J5	5.525
Alton,Ill. L1	5.75
Atlanta A11	5.775
Bartonville,Ill. K4	5.625
Buffalo W12	5.525
Chicago W13	5.525
Cleveland A7, C20	5.525
Crawfordsville,Ind. M8	5.625
Donora,Pa. A7	5.525
Duluth,Minn. A7	5.525
Fairfield,Ala. T2	5.525
Fostoria,O. (24) S1	5.75
Houston S5	5.925
Johnstown,Pa. B2	5.525
Joliet,Ill. A7	5.525
KansasCity,Mo. S5	6.125
Kokomo,Ind. C16	5.625
LosAngeles B3	6.475
Minnequa,Colo. C10	5.775
Monessen,Pa. P7	5.525
No.Tonawanda,B11	5.525
Palmer,Mass. W12	5.825
Pittsburg,Calif. C11	6.475
Portsmouth,O. P12	5.525
Rankin,Pa. A7	5.525
So.Chicago,Ill. R2	5.525
So.SanFrancisco C10	6.475
SparrowsPoint,Md. B2	5.625
Sterling,Ill. (1) N15	5.525
Struthers,O. Y1	5.525
Torrance,Calif. C11	6.475
Waukegan,Ill. A7	5.525
Worcester,Mass. A7	5.525

WIRE, MB Spring, High Carbon	
Aliquippa,Pa. J5	6.925
Alton,Ill. L1	7.15
Bartonville,Ill. K4	7.025
Buffalo W12	6.925
Cleveland A7	6.925
Donora,Pa. A7	6.925
Duluth,Minn. A7	6.925
Fostoria,O. S1	6.925
Johnstown,Pa. B2	6.925
Millbury,Mass. (12) N6	8.725
Minnequa,Colo. C10	7.175
Monessen,Pa. P7	6.925
Monessen,Pa. P16	6.95
Muncie,Ind. I-7	7.125
Palmer,Mass. W12	7.225
Pittsburg,Calif. C11	7.875
Portsmouth,O. P12	6.925
Roebling,N.J. R5	7.225
So.Chicago,Ill. R2	6.925
So.SanFran. C10	7.875
SparrowsPt.,Md. B2	7.025
Struthers,O. Y1	6.925
Trenton,N.J. A7	7.225
Waukegan,Ill. A7	6.925
Worcester A7, J4	7.225
Worcester T6, W12	7.225

WIRE, Upholstery Spring	
Aliquippa,Pa. J5	6.625
Alton,Ill. L1	6.85
Buffalo W12	6.625
Cleveland A7	6.625
Donora,Pa. A7	6.625
Duluth,Minn. A7	6.625
Johnstown,Pa. B2	6.625
LosAngeles B3	7.575
Minnequa,Colo. C10	6.875
Monessen,Pa. P7, P16	6.625
NewHaven,Conn. A7	6.925
Palmer,Mass. W12	6.925
Pittsburg,Calif. C11	7.575
Portsmouth,O. P12	6.625
Roebling,N.J. R5	6.925
So.Chicago,Ill. R2	6.625
So.SanFrancisco C10	7.575
SparrowsPoint,Md. B2	6.725
Torrance,Calif. C11	7.575
Trenton,N.J. A7	6.925
Waukegan,Ill. A7	6.625
Worcester,Mass. A7	6.925

WIRE, Fine & Weaving (8"Coils)	
Alton,Ill. L1	10.75
Bartonville,Ill. K4	10.65
Buffalo W12	10.55
Chicago W13	10.55
Cleveland A7	10.55
Crawfordsville,Ind. M8	10.55
Fostoria,O. S1	10.55
Kokomo,Ind. C16	10.55
Monessen,Pa. P16	10.55
Muncie,Ind. I-7	10.75
Palmer,Mass. W12	10.85
Roebling,N.J. R5	10.85
So.SanFrancisco C10	10.90
Waukegan,Ill. A7	10.55
Worcester,Mass. A7, T6	10.85

WIRE, Galv'd ACSR for Cores	
Bartonville,Ill. K4	9.50
Johnstown,Pa. B2	9.50
Monessen,Pa. P16	9.50
Muncie,Ind. I-7	9.70
Roebling,N.J. R5	9.80
SparrowsPt.,Md. B2	9.60

ROPE WIRE	(A)
Alton,Ill. L1	9.45
Bartonville,Ill. K4	9.35
Buffalo W12	9.35
Fostoria,O. S1	9.35
Johnstown,Pa. B2	9.35
Monessen,Pa. P7, P16	9.35
Muncie,Ind. I-7	9.55
Palmer,Mass. W12	9.65
Portsmouth,O. P12	9.35
Roebling,N.J. R5	9.65
SparrowsPt., B2	9.45
Struthers,O. Y1	9.35
Worcester J4 T6	9.65
(A) Plow and Mild Plow; add 0.2c for improved plow.	

WIRE, Tire Bead	
Alton,Ill. L1	12.75
Bartonville,Ill. K4	12.65
Monessen,Pa. P16	12.00
Roebling,N.J. R5	12.85

WIRE, Cold-Rolled Flat	
Anderson,Ind. G6	7.45
Buffalo W12	7.45
Cleveland A7	7.45
Crawfordsville,Ind. M8	7.55
Dover,O. G6	7.45
Fostoria,O. S1	7.45
Kokomo,Ind. C16	7.55
FranklinPark,Ill. T6	7.60
Massillon,O. R8	7.45
Monessen,Pa. P16	8.00
Monessen,Pa., P7	7.45
Pawtkt.R.I.(12)+ N8	7.75
Trenton,N.J. R5	7.75
Worcester A7, T6, W12	7.75

WIRE, Merchant Quality (6 to 8 gage)	An'ld.	Galv.
AlabamaCity R2,	6.675	7.075
Aliquippa J5	6.675	7.20*
Atlanta A11	6.925	7.475
Bartonville(19)K4	6.675	7.225
Buffalo W12	6.675	7.075
Cleveland A7	6.675	
CrawfordsvilleM8	6.775	7.325
Donora,Pa. A7	6.675	7.075†
Duluth,Minn. A7	6.675	7.075†
Fairfield T2	6.675	7.075†
Houston,Tex. S5	7.075	7.475
Johnstown B2(48)	6.675	7.225
Joliet,Ill. A7	6.675	7.075†
KansasCity,Mo. S5	7.275	7.675
Kokomo C16	6.775	7.175
LosAngeles B3	7.625	
Minnequa C10	6.925	7.325**
Monessen P7 (48)	6.675	7.225
Palmer W12	6.975	7.375
Pitts.,Calif. C11	7.625	8.025†
Prtsmth (18)+ P12	6.675	
Rankin A7	6.675	7.075†
So.Chicago R2	6.675	6.325
So.S.Fran.(48)+C10	7.625	8.025**
Spar'wsPt. B2(48)+	6.775	7.325
Sterl'g(1)(48)+N15	6.675	7.225
Struthers,O. Y1	6.675	7.175
Worcester A7	6.975	

* Based on 10c zinc; † 5c zinc; ** Subject to zinc equalization extras.

WIRE (16 gage)	An'ld. Stone	Galv. Stone
Aliquippa J5	10.63	12.72*
Bartonville(19)K4	10.73	12.51
Cleveland A7	12.50	
Crawfordsville M8	12.50	14.35
Fostoria,O. S1	12.60	14.15
Johnstown B2	12.50	14.35
Kokomo C16	12.60	14.15
Minnequa C10	12.75	14.45**
Palmer,Mass.W12	12.50	14.05
Pitts.,Calif. C11	12.85	14.40†
SparrowsPt. B2	12.60	14.45
Sterling(1)+ N15	10.73	12.15
Waukegan A7	12.50	14.05†
Worcester A7	12.80	

* Based on 11c zinc; † 5c zinc; ** Subject to zinc equalization extras.

WIRE, Barbed	Col.
AlabamaCity,Ala. R2	153
Aliquippa J5	150*
Atlanta A11	159
Bartonville,Ill. (19) K4	156
Crawfordsville,Ind. M8	159
Donora,Pa. A7	153†
Duluth,Minn. A7	153†
Fairfield,Ala. T2	153†
Houston,Tex. S5	161
Johnstown,Pa. B2	156
Joliet,Ill. A7	153
KansasCity,Mo. S5	165
Kokomo,Ind. C16	155
Minnequa,Colo. C10	159**
Monessen,Pa. P7	157
Pittsburg,Calif. C11	173†
Rankin,Pa. A7	153†
So.Chicago,Ill. R2	153
S. SanFrancisco C10	173**
SparrowsPoint,Md. B2	158
Sterling,Ill.(1) N15	156

† Based on 5c zinc; * 11c zinc; ** Subject to zinc equalization extras.

WOVEN FENCE, 9-15½ Ga. Col.	
AlabamaCity,Ala. R2	140
Ala.City,Ala. 17 ga. R2	235
Ala.City,Ala. 18 ga. R2	215
Aliqp'pa,Pa.9-11½ga. J5	145*
Atlanta A11	146
Bartonville,Ill.(19) K4	143
Crawfordsville,Ind. M8	145
Donora,Pa. A7	140†
Duluth,Minn. A7	140†
Fairfield,Ala. T2	140†
Houston,Tex. S5	148
Johnstown,Pa. B2	143
Johnstown 17 ga.,6" B2	234
Johnstown, 4"	237
Joliet,Ill. A7	140†
KansasCity,Mo. S5	152
Kokomo,Ind. C16	142
Minnequa,Colo. C10	148**
Monessen,Pa. 9 ga. P7	145
Pittsburg,Calif. C11	163†
Rankin,Pa. A7	140†
So.Chicago,Ill. R2	140
Sterling,Ill. (1) N15	143

† Based on 5c zinc; * 11c zinc; ** Subject to zinc equalization extras.

BALE TIES, Single Loop	Col.
AlabamaCity,Ala. R2	149
Atlanta A11	152
Bartonville,Ill.(19) K4	149
Crawfordsville,Ind. M8	151
Donora,Pa. A7	149
Duluth,Minn. A7	149
Fairfield,Ala. T2	149
Joliet,Ill. A7	149
KansasCity,Mo. S5	161
Kokomo,Ind. C16	151
Minnequa,Colo. C10	154
Pittsburg,Calif. C11	173
So.Chicago,Ill. R2	149
So.SanFran.,Calif. C10	173
SparrowsPoint,Md. B2	151
Sterling,Ill.(1) N15	149

NAILS, Stock To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	131
Aliquippa,Pa. J5	131
Atlanta A11	134
Bartonville,Ill. (19) K4	131
Chicago,Ill. W13	131
Cleveland A9	137
Crawfordsville,Ind. M8	133
Donora,Pa. A7	131
Duluth,Minn. A7	131
Fairfield,Ala. T2	131
Galveston,Tex. D7	139
Houston,Tex. S5	139
Johnstown,Pa. B2	131
Joliet,Ill. A7	131
KansasCity,Mo. S5	143
Kokomo,Ind. C16	133
Minnequa,Colo. C10	136
Monessen,Pa. P7	131
Pittsburg,Calif. C11	150
Portsmouth,O. P12	132
Rankin,Pa. A7	131
So.Chicago,Ill. R2	131
SparrowsPt.,Md. B2	133
Sterling,Ill. (1) N15	131
Worcester,Mass. A7	137

NAILS, Cut (100 lb keg) to dealers (33)	
Conshohocken,Pa. A3	$8.00
Wheeling,W.Va. W10	8.00

STAPLES, Polished, Stock To dealers & mfrs. (7)	Col.
AlabamaCity,Ala. R2	131
Aliquippa,Pa. J5	133
Atlanta A11	136
Bartonville,Ill. (19) K4	133
Crawfordsville,Ind. M8	135
Donora,Pa. A7	133
Duluth,Minn. A7	133
Fairfield,Ala. T2	133
Johnstown,Pa. B2	133
Joliet,Ill. A7	133
Kokomo,Ind. C16	135
Minnequa,Colo. C10	138
Monessen,Pa. P7	133
Pittsburg,Calif. C11	152
Portsmouth,O. P12	132
Rankin,Pa. A7	133
So.Chicago,Ill. R2	131
SparrowsPt.,Md. B2	135
Sterling,Ill. (1) N15	133
Worcester,Mass. A7	139

—FENCE POSTS—

	Col.
ChicagoHts.,Ill. C2, I-2	145
Duluth,Minn. A7 (49)	136
Franklin,Pa. F5	145
Johnstown,Pa. B2	145
Marion,O. P11	145
Minnequa,Colo. C10	150
Moline,Ill. R2	145
So.Chicago,Ill. R2	145
Tonawanda,N.Y. B12	148
Williamsport,Pa. S19	158

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Sizes—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	15.75	list	19.75	2.5	22.25	5	23.75	6.5	23.75	6.5	23	5.75	25.5	8.25
Ambridge, Pa. N2 (‡)	15.75	...	19.75	...	22.25	...	23.75	...	23.75	...	23	...	25.5	...
Lorain, O. N3 (*)	15.75	4.5	19.75	5.5	22.25	8	23.75	9.5	23.75	9.5	23	8.75	25.5	11.25
Youngstown Y1 (‡‡)	15.75	list	19.75	2.5	22.25	5	23.75	6.5	23.75	6.5	23	5.75	25.5	8.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2 (**)	15.75	0.75	19.75	3	22.25	5.5	23.75	7	23.75	7	23	6.25	25.5	8.75

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Sizes—Inches	⅛		¼		⅜		½		¾		1		1¼		1½	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c		27.5c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28		2.73	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	...	...	...	...	...	...	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
Alton, Ill. L1 ($)	...	...	...	...	...	...	23.25	7	26.25	11	28.75	14.5	31.25	15.5	31.75	16.5
Benwood, W. Va. W10(††)	25.5	+0.75	17.75	+6	10.25	+10.75	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
Butler, Pa. F6 (‡)	26.5	+2.75	19.5	+7.25	12.5	+13	...	...	...	...	...	...	...	...	...	...
Etna, Pa. N2 (‡)	...	...	...	...	...	...	26.25	7	29.25	11	31.75	14.5	34.25	16.25	34.75	17.25
Fontana, Calif. ($)	...	...	...	...	...	...	13.25	+3	16.25	1	18.75	4.5	21.25	5.5	21.75	6.5
Ind. Harbor Y1 (‡‡)	...	...	...	...	...	...	25.25	9	28.25	13	30.75	16.5	33.25	17.5	33.75	18.5
Lorain, O. N3 (*)	...	...	...	...	...	...	26.25	16	29.25	20	31.75	23.5	34.25	23	34.75	24
Sharon, Pa. S4 (‡)	26.5	−0.25	19.5	+4.25	12.5	+8.5	...	...	...	...	...	...	...	...	...	...
Sharon, Pa. M6	...	...	...	...	...	...	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
Sparrows Pt., Md. B2 ($)	24.5	+1.75	17.5	+6.25	10.5	+10.5	24.25	8	27.25	12	29.75	15.5	32.25	16.5	32.75	17.5
Youngstown R2 (**)	...	...	...	...	...	...	26.25	11	29.25	15	31.75	18.5	34.25	19.25	34.75	20.25
Youngstown Y1 (‡‡)	...	...	...	...	...	...	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5
Wheatland, Pa. W9 (‡)	24.5	+1.75	17.5	+6.25	10.5	+10.5	26.25	10	29.25	14	31.75	17.5	34.25	18.5	34.75	19.5

Size—Inches	2		2½		3		3½		4	
List Per Ft.	37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft.	3.68		5.82		7.62		9.20		10.89	
	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv	Blk	Galv
Aliquippa, Pa. J5 (‡)	35.25	20	36.75	20	36.75	20	...	...	...	...
Alton, Ill. L1 ($)	32.25	17	33.75	17	33.75	17	...	...	...	...
Benwood, W. Va. W10(††)	35.25	20	36.75	20	36.75	20	27.75	10.5	27.75	10.5
Etna, Pa. (‡)	35.25	17.25	36.75	18.5	36.75	18.5	27.75	9	27.75	9
Fontana, Calif. K1 ($)	22.25	7	23.75	7	23.75	7	...	...	...	...
Ind. Harbor, Ind. Y1 (‡‡)	34.25	19	35.75	19	35.75	19	...	...	...	...
Lorain, O. N3 (*)	35.25	24.5	36.75	23	36.75	23	...	...	...	...
Sharon, Pa. M6	35.25	20	36.75	20	36.75	20	...	...	...	...
Sparrows Pt., Md. B2 ($)	32.25	18	34.75	18	34.75	18	25.75	8.5	25.75	8.5
Youngstown R2 (**)	35.25	20.75	36.75	20.5	36.75	20.5	27.75	11	27.75	11
Youngstown Y1 (‡‡)	35.25	20	36.75	20	36.75	20	...	...	...	...
Wheatland, Pa. W9 (‡)	35.25	20	36.75	20	36.75	20	...	...	...	...

Galvanized pipe discounts based on zinc price of: (‡), 14c; (‡), 11c to under 12c; (*), 5c; ($), 11.00c; (‡‡), 10.50c-11.50c; with discounts adjusted on price of zinc at time of shipment.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	21.31	18.44
1¼	13	....	25.24	18.12
1½	13	23.12	27.89	20.01
1¾	13	26.84	32.37	23.66
2	13	30.08	36.28	26.51
2¼	13	34.18	41.23	29.86
2¼	12	37.10	44.75	32.41
2½	12	40.51	48.86	35.70
2¾	12	43.85	52.90	38.66
3	12	45.92	55.39	41.23

RAILWAY MATERIALS

RAILS	Std. No. 1	Std. No. 2	Std. All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	4.325	4.225	4.275	5.20
Ensley,Ala. T2	4.325	4.225	....	5.20
Fairfield,Ala. T2	....	....	....	5.20
Gary,Ind. U5	4.325	4.225	4.275	....
Huntington,W.Va. W7	....	....	....	5.20
IndianaHarbor,Ind. I-2	4.325	4.225	4.275	....
Johnstown,Pa. B2	....	....	....	(16)5.20
Lackawanna,N.Y. B2	4.325	4.225	....	5.20
Minnequa,Colo. C10	4.325	4.125	....	5.70
Steelton,Pa. B2	4.325	4.225	....	....
Williamsport,Pa. S19	....	....	....	5.20

TIE PLATES	
Fairfield,Ala. T2	5.125
Gary,Ind. U5	5.125
Ind.Harbor,Ind. I-2	5.125
Lackawanna,N.Y. B2	5.125
Minnequa,Colo. C10	5.125
Pittsburg,Calif. C11	5.275
Seattle,B3	5.275
Steelton,Pa. B2	5.125
Torrance,Calif. C11	5.275

TRACK BOLTS (20) Treated	
KansasCity,Mo. S5	11.00
Lebanon,Pa. (31) B2	10.75
Minnequa,Colo. C10	11.00
Pittsburgh 03, Pa. P14	11.00

JOINT BARS	
Bessemer,Pa. U5	5.275
Fairfield,Ala. T2	5.275
Ind.Harbor,Ind. I-2	5.275
Joliet,Ill. U5	5.275
Lackawanna,N.Y. B2	5.275
Minnequa,Colo. C10	5.275
Steelton,Pa. B2	5.275

AXLES	
Ind.Harbor,Ind. S13	6.50
Johnstown,Pa. B2	6.50

STANDARD TRACK SPIKES	
Ind.Harbor,Ind. I-2, Y1	7.05
KansasCity,Mo. S5	7.30
Lebanon,Pa. B2	7.05
Minnequa,Colo. C10	7.05
Pittsburgh Jo	7.05
Seattle B3	7.55
So.Chicago,Ill. R2	7.05
Struthers,O. Y1	7.05
Youngstown R2	7.05

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh; f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in.larger 8.90c
⅝-in. under .....26.5 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..... List

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants, per cent off list for less than case lots to consumers)

6 in. and shorter:
½-in. & smaller diam. 4
⅝-in. & ⅝-in. 3
¾-in. and larger ... 3
Longer than 6 in.:
All diams. ..... +4
Lag bolts, all diams.:
6 in. and shorter.... 12
Over 6 in. long 8
Ribbed Necked Carriage 5
Blank 25
Plow 25
Step, Elevator, Tap and Sleigh Shoe 12
Tire Bolts ..... List
Boiler & Fitting-Up Bolts 25

NUTS

H.P. & C.P., regular & heavy:
Square, all sizes 5⅝
H.P., Hex, regular & heavy:
⅝" and smaller 5⅝
⅞" to 1⅛", inclusive 60
1¼" to 1½", inclusive 62
1⅝" and larger 5⅝
C.P. Hex, regular heavy:
All sizes 5⅝
Hot Galv. Nuts (all types):
¾" and smaller 40
⅞" to 1½", inclusive. 43
Finished Hex Nuts:
New standard, all sizes 5⅝
Semifinished & Slotted Hex.:
Regular and heavy, all sizes 5⅝

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam x 6 in. and shorter 34
1 in. and smaller diam. x over 6 in. 20

HEADLESS SET SCREWS

(Packaged, per cent off list)

No. 10 and smaller ... 34
¼-in. diam. & larger . 14
N.F. thread, all diams. 8

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)

Plain finish ..... 47.5 & 10
Plated finishes .... 30 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:
⅝-in. & smaller ... 38
¾-in. through 1 in. ... 22
Longer than 6 in.:
⅝-in. and smaller ... 20
¾-in. through 1 in. ... 7

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛" to 1 7/16"; 1 7/16" to 1 15/16" 4.58c; 1 15/16" and 2 7/16" 4.95c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cds. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.142 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ½" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25c off for untreated.
(21) New Haven, Conn. base.
(22) Del. San Francisco Bay area 7.55/16" 4.95c.
(23) 26 Ga., 36" wide.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths, to fabricators, to consumers, 2 lbs.
(27) Bar mill sizes.
(28) Rounderized.
(29) Youngstown base.
(30) Sheared; add 0.35c for universal mill.
(31) Not annealed.
(32) Rd. or square edge.
(33) To jobbers, deduct 20c.
(34) 9.00c for cut lengths.
(35) 22" and narrower.
(36) 24" and narrower.
(37) 15 gage & lighter; 60" & narrower.
(38) 14 gage & lighter; 48" and narrower.
(39) 18" and narrower.
(40) Lighter than 0.015", 0.015" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) 6.7 gage.
(43) 1 pref.; add 2 cols. for T pref.
(50) 0.025 gage; 6.55c for 0.026 to 0.068 gage; 6.65c for 0.069 gage and over.

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge iron:	
98+ % Fe, annealed	18.00
Unannealed	14.50
Swedish, c.i.f. N. Y., c.l., in bags	11.25
Electrolytic iron:	
Annealed, 99.5% Fe.	42.50
Unannealed (99+ % Fe)	36.50
Unannealed (99+ % Fe) (minus 325 mesh)	53.50
Powder Flakes	48.50
Carbonyl Iron: 97.9-99.8% size 5 to 10 microns.	83.00-148.00
Aluminum:	
Carlots, freight allowed	31.00
Atomized, 500 lb drums, freight allowed	34.00
Antimony, 500 lb lots	78.00
Brass, 20-ton lots	29.50-36.50
Bronze, 10-ton lots	51.00-60.00
Copper:	
Electrolytic	43.25
Reduced	43.25
Lead	21.75
Magnesium	75.00-85.00
Manganese:	
Minus 100 mesh	57.00
Minus 35 mesh	52.00
Minus 200 mesh	62.00
Nickel unannealed	89.50
Nickel-Silver 5-ton lots	47.00
Silicon	38.50
Solder	8.50*
Stainless Steel, 302	91.00
Tin	14.00*
Zinc, 10-ton lots	17.50-25.00
*Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over	5.35
Less than 1000 lb	5.50
Chromium, electrolytic 99.9% Cr min.	3.50

*Plus cost of metal.

STAINLESS STEEL MILL PRICES

(Representative prices, cents per pound; subject to current lists of extras)

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	Shapes; H.R. Strip	Shapes; H.R. & C.F. Bars; Wire	Plates	Sheets	C.R. Strip; Flat Wire
301	16.25	20.50	29.50	34.25	29.75	35.25	37.25	46.25	38.25
302	17.25	22.75	29.75	34.50	32.00	35.50	37.50	46.50	41.50
302B ...	18.50	24.50	30.50	34.50	35.00	35.50	37.50	48.75	44.75
303	18.75	24.75	32.25	37.25	36.75	38.25	39.75	48.75	45.50
304	18.25	23.75	31.00	36.00	34.25	37.25	39.75	48.75	43.75
304L ...	....	....	36.75	....	....	42.75	45.25	54.25	49.00
306	19.50	25.50	....	36.25	37.00	37.50	42.00	51.75	46.75
308	19.75	26.25	35.25	40.75	38.00	42.00	46.00	55.25	48.00
309	26.50	34.75	43.25	49.25	49.25	50.50	53.75	63.50	62.00
309S	28.50	37.50	47.50	54.50	54.00	55.50	59.00	68.50	68.50
310	33.00	43.25	56.75	66.25	67.50	67.50	69.00	72.25	78.75
314	....	....	....	....	....	....	69.00	74.50	....
316	28.00	36.25	46.75	54.50	55.00	55.50	59.00	64.50	66.50
316L ...	....	....	52.50	....	....	61.00	64.25	70.00	72.00
317	33.00	43.50	58.25	66.75	67.50	68.25	70.75	77.00	79.25
318	33.50	44.00	55.25	64.50	66.25	65.50	68.75	78.00	80.25
321	22.75	29.50	35.25	40.75	42.00	42.00	46.00	55.50	54.50
330	....	....	58.00	....	....	68.50	70.00	73.75	77.75
347	24.50	32.25	39.50	45.75	46.50	46.75	51.25	60.75	59.25
403	....	....	27.00	30.75	....	32.00	34.25	44.00	41.25
405	16.50	21.75	25.25	29.25	30.50	30.25	31.75	42.50	39.75
410	14.00	18.25	24.00	27.75	26.25	28.75	30.00	40.75	34.25
416	....	....	24.50	28.25	....	29.25	30.50	41.25	41.25
420	22.00	28.50	29.25	34.00	35.50	35.00	38.50	49.25	52.75
430	14.25	18.50	24.50	28.25	27.00	29.25	30.50	43.50	34.75
430F ...	....	18.75	25.00	28.75	....	29.75	31.00	44.00	44.00
431	14.50	28.50	25.00	28.25	27.50	29.25	30.50	44.00	35.25
440A,B,C	....	28.50	29.25	34.00	....	35.00	38.50	49.25	52.75
442	....	....	28.00	....	....	30.50	35.25	48.25	47.75
446	....	....	33.75	38.25	53.00	39.50	40.75	59.75	71.00
501	....	....	14.00	14.50	21.25	16.00	18.25	30.50	29.00
502	....	....	15.25	16.00	22.25	17.00	20.00	31.75	30.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co., Inc.; American Steel & Wire Division, U. S. Steel Corp.; Armco Steel Corp.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Co.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Division, Borg Warner Corp.; Jessop Steel Co.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; Page Steel & Wire Division, American Chain & Cable Co. Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Stainless Welded Products Inc.; Superior Steel Corp.; Timken Roller Bearing Co.; Tube Methods Inc.; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

CLAD STEEL

Cladding Stainless	Plates—Carbon Base 10%	Plates—Carbon Base 20%	Sheets—Carbon Base 20%	Sheets—Copper Base Both Sides
302	....	31.00	31.00	77.00
304	27.60	32.50-32.70	32.50	77.00
310	36.50	41.00	.....	144.00
316	32.60	37.70-42.75	42.75	....
318	37.00	42.20	.....	....
321	29.30	34.40-37.00	37.00	111.00
347	30.40	35.50-40.50	40.50	130.00
405	23.40	30.60	.....	....
410	22.90	30.10	.....	....
430	22.90	30.10	.....	....
Inconel ..	41.23	54.18	.....	165.00
Nickel ..	37.50	50.90	.....	....
Monel ...	38.90	51.80	.....	....
Copper* .	....	.....	46.00	....

	Strip, Carbon Base—Cold-Rolled 10%	Cold-Rolled Both Sides	Hot-Rolled 10%	Hot-Rolled Both Sides
Copper*	27.85	35.85	24.00	32.25

* Deoxidized. Production points: Stainless sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont Del. C22 Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates Coatesville L7; copper-clad strip, Carnegie, Pa. S18. Production point for copper-base sheets is Carnegie, Pa. A13.

TOOL STEEL

Grade	$ per lb	Grade	$ per lb
Regular Carbon .	0.25-.285	5% Cr Hot Work....	0.39
Extra Carbon ..	0.33-.340	W-Cr Hot Work	0.41
Special Carbon ..	0.35-.360	V-Cr Hot Work	0.43
Oil Hardening ...	0.370-.39	Hi-Carbon-Cr. ..	0.665-.70

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	4.055
18.25	4.25	1	4.75	...	2.340
18	4	2	9	...	2.565-2.695
18	4	2	...	...	1.820
18	4	1	...	...	1.580-1.660
13.5	4	3	...	...	1.875
6.4	4.5	1.9	...	5	1.065
6	4	3	...	6	1.300
2	1.4	1.2	...	...	0.495
1.5	4	1	...	8.5	0.895

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

PIG IRON, Gross Ton

F.o.b. furnace prices as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem,Pa. B2	$58.00	$58.50	$59.00	$59.50
New York, del.	....	62.28	62.78	....
Newark, del.	61.02	61.52	62.02	62.52
Philadelphia, del.	60.75	61.25	61.75	62.25
Birmingham District				
AlabamaCity,Ala. R2	52.38	52.88	....	....
Birmingham R2	52.38	52.88	....	....
Birmingham U6	....	52.88	....	....
Woodward,Ala. W15	52.38	52.88	....	....
Cincinnati, del.	....	60.43	....	....
Buffalo District				
Buffalo R2, H1	56.00	56.50	57.00	....
Tonawanda,N.Y. W12	56.00	56.50	57.00	....
No. Tonawanda,N.Y. T9	....	56.50	57.00	....
Boston, del.	66.65	67.15	67.65	....
Rochester,N.Y., del.	59.02	59.52	60.02	....
Syracuse,N.Y., del.	60.12	60.62	61.12	....
Chicago District				
Chicago I-3	56.00	56.50	56.50	57.00
Gary,Ind. U5	56.00	....	56.50	....
IndianaHarbor,Ind. I-2	56.00	....	56.50	....
So.Chicago,Ill. W14, Y1	56.00	56.50	56.50	....
So.Chicago,Ill. U5	56.00	....	56.50	57.00
Milwaukee, del.	58.17	58.67	58.67	59.17
Muskegon,Mich., del.	....	62.80	62.80	....
Cleveland District				
Cleveland A7	56.00	56.50	56.50	57.00
Cleveland R2	56.00	56.50	56.50	....
Akron,O., del. from Cleve.	58.75	59.25	59.25	59.75
Lorain,O. N3	56.00	....	....	57.00
Pittsburgh District				
NevilleIsland,Pa. P6	56.00	56.50	56.50	....
Pitts.,N.&S. sides, Ambridge, Aliquippa, del.	57.37	57.87	57.87	....
McKeesRocks, del., Lawrenceville, Homestead, Wilmerding, Monaca, del.	57.04	57.54	57.54	....
Verona, Trafford, del.	57.66	58.16	58.16	....
Brackenridge, del.	58.19	58.69	58.69	....
Bessemer,Pa. U5	58.45	58.95	58.95	....
Clairton,Rankin,So.Duquesne,Pa. U5	56.00	....	56.50	57.00
McKeesport,Pa. N3	56.00	....	....	....
Midland,Pa. C18	56.00	....	....	57.00
Monessen,Pa. P7	56.00	....	....	....
Youngstown District				
Hubbard,O. Y1	....	....	56.50	....
Youngstown Y1	....	....	56.50	57.00
Youngstown U5	56.00	....	....	57.00
Mansfield,O., del.	60.90	....	61.40	61.90
Duluth I-3	56.00	56.50	56.50	57.00
Erie,Pa. I-3	56.00	56.50	56.50	57.00
Everett,Mass. E1	....	63.25	63.75	....
Fontana,Calif. K1	62.00	62.50	....	....
Geneva,Utah C11	57.50	58.00	....	....
GraniteCity Ill. G4	57.90	58.40	58.90	....
Ironton,Utah C11	56.00	56.50	....	....
LoneStar,Texas L6	52.00	52.50*	52.50	....
Minnequa,Colo. C10	58.00	59.00	59.00	....
Rockwood,Tenn. T3	....	....	58.50	....
Sharpsville,Pa. S6	56.00	56.50	56.50	57.00
Steelton,Pa. B2	58.00	58.50	59.00	59.50
Struthers,Ohio Y1	*58.00*	*58.50*	*59.00*	*59.50*
Toledo,O. I-3	56.00	56.50	56.50	57.00
Cincinnati, del.	61.76	62.26	....	....
Troy,N.Y. R2	58.00	58.50	59.00	....

*Low phos. southern grade.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.0-6.50% silicon; add $1.50 for each 0.5% Si; 75 cents for each 0.5% Mn over 1%)

Jackson,O. G2, J1	$67.00
Buffalo H1	68.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.45 for each 0.5% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$91.00
Keokuk,Iowa, Openhearth & Fdry, freight allowed K2	95.50
Keokuk, OH & Fdry, 12½ lb piglets, 16% Si, frt. allowed K2	98.50
Wenatchee,Wash., OH & Fdry, freight allowed K2	95.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$61.00
Rockwood,Tenn. T3	68.50
Steelton,Pa. B2	64.00
Philadelphia, delivered	67.56
Troy,N.Y. R2	64.00

FACTS

...About a Straight Chrome Stainless Steel That Shows Unusual Promise for Your Applications...

If your products or components call for the properties of a stainless steel, here is a stainless that shows unusual promise for many applications. And this steel (Carpenter No. 3, Type 443) is particularly important today for jobs requiring an improved straight chrome stainless to replace the 18-8's restricted by Government Regulations. Carpenter Stainless No. 3 gives you *excellent corrosion resistance, high resistance to scaling,* and a *low annealing temperature (500°F lower than type 304).* Moreover, No. 3 provides machinability comparable to SAE 3145, 3250 or 4650. For more information on No. 3—its mechanical properties, relative workability, corrosion resistance, recommended uses, etc....drop us a line on your Company letterhead for the new descriptive folder on Carpenter No. 3.

Typical user reports on Carpenter Stainless No. 3

This rod end bearing for military aircraft must have heat resistance, ability to resist salt corrosion, good machinability and good cold forging qualities. *Carpenter No. 3* has met all these requirements and is giving an excellent account of itself both as to corrosion and heat resistance at operating temperatures up to 1000°F. Moreover, No. 3 is not subject to intergranular corrosion at this temperature.

These jaw inserts for tenter clips grip and stretch nylon cloth as it rolls through finishing stages. Inserts must be spotless and must resist corrosive action of the dyes because a slight surface defect could break the threads. In addition to good corrosion resistance, *No. 3* gave the inserts high wear resistance for long service—including resistance to abrasion from talc and china clay used in other textiles processed.

A word about availability...

Carpenter Stainless No. 3 (Type 443) is available from Reading Warehouse Stocks, hot rolled annealed in sizes $\frac{3}{8}$" to $2\frac{3}{4}$" round. Other standard bar sizes and finishes, also cold rolled strip, are manufactured to order in minimum quantities of 500 pounds per size. Mill shipments are currently 60 to 120 days from receipt of order and neither priorities nor allotments are required.

CARPENTER SPECIALTY STEELS

CARPENTER MATCHED TOOL & DIE STEELS, STAINLESS STEELS, PLASTIC MOLD STEELS, INDUSTRIAL & ELECTRICAL ALLOY STEELS, HIGH SPEED TOOL BITS, TOOL STEEL DRILL RODS & STAINLESS TUBING & FINE WIRE

THE CARPENTER STEEL CO., 139 W. Bern St., Reading, Pa.
Export Department: The Carpenter Steel Co., Port Washington, N. Y. — "CARSTEELCO"

Carpenter

Stainless Steel

pioneers in improved specialty steels

Call your nearest Carpenter Mill-Branch Warehouse, Office or Distributor

WAREHOUSE STEEL PRODUCTS

(Representative prices, cents per pound, subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except: New York, 30 cents; Philadelphia, 25 cents; Birmingham, Cincinnati, St. Paul, 15 cents.)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot Rolled	Cold Rolled	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.‡	H.R. Alloy 4140††‡		Carbon	Floor
Baltimore	6.20	7.64	7.81	7.00	...	6.86	8.17[4]	12.04	6.98	6.85	7.98
Birmingham	6.10	7.60	8.00[3]	6.30	...	6.15	8.90	....	6.35	6.35	8.65
Boston	6.89	7.83	9.23	7.13	...	6.87	8.35	12.28	7.06	7.13	8.26
Buffalo	6.18	7.15	9.01	6.79	...	6.35	7.70	12.17	6.59	6.68	7.88
Charlotte, N. C.	6.95	7.80	8.69	6.90	...	7.10	8.37	....	7.10	7.10	8.37
Chicago	6.18	7.12	8.05	6.42	...	6.28	7.20	11.75	6.46	6.33	7.46
Cincinnati	6.51	7.19	8.47	6.72	...	6.58	7.66	12.17	6.93	6.85	7.88
Cleveland	6.18	7.12	7.90	6.58	...	6.34	7.65	11.89	6.79	6.50	7.79
Detroit	6.38	7.31	8.34	6.71	7.36	6.56	7.60	11.92	6.93	6.85	7.80
Houston	7.15	7.85	9.32	7.45	...	7.45	...	....	7.35	7.20	8.55
JerseyCity,N.J.	6.54	7.45	8.72	6.82	...	6.75	8.43[4]	11.84	6.50	6.67	8.01
Los Angeles	7.25	9.00	9.35	7.55	11.20	7.15	9.10	13.05	7.35	7.20	9.25
Milwaukee	6.35	7.29	8.22	6.59	...	6.45	7.57	11.92	6.63	6.50	7.63
Moline, Ill.	6.53	7.47	8.40	6.77	...	6.63	7.65	....	6.81	6.68	...
New York	6.54	7.45	8.72	6.82	...	6.75	8.43[4]	11.84	6.50	6.67	8.01
Newark, N. J.	6.78	7.75	9.02	7.16	...	7.06	8.43[4]	....	6.90	6.99	8.30
Norfolk, Va.	6.90	....	....	7.20	...	7.20	8.50	....	7.20	7.15	7.85
Philadelphia	6.53	7.55	8.35	7.02	8.80	6.87	8.19[4]	11.89	6.67	6.63	7.65
Pittsburgh	6.18	7.12	8.30	6.55	...	6.28	7.65	11.89	6.46	6.33	7.46
Portland, Oreg.	7.90	9.30	10.00	7.90	...	7.60	10.65	....	7.50	7.55	9.40
Richmond, Va.	6.50	7.45	8.00	7.10	...	7.05	7.95	....	7.10	6.85	8.10
St. Louis	6.48	7.42	8.35	6.72	...	6.58	7.70	12.05	6.86	6.73	7.86
St. Paul	6.84	7.78	8.71	7.08	...	6.94	8.06	....	7.12	6.99	8.12
San Francisco	7.35	8.70	10.15	7.60	...	7.15	9.75	13.05	7.25	7.20	9.25
Seattle	8.15	8.70	10.10	8.02	...	7.58	10.13	13.50	7.50	7.59	9.40
Spokane	8.15	9.25[7]	10.10	8.50	...	7.60	11.00[4]	14.15	7.25	7.35	9.80
Washington	6.71	8.15	8.35	7.51	...	7.37	8.43	....	7.49	7.36	8.49

*Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gages extra excluded); ‡ includes 35-cent special bar quality extra; § as rolled; †† as annealed; ** ⅛" and heavier, 8.09c for No. 12 and lighter. Base quantities, 2000 to 9999 lb except as noted. Cold-rolled strip, 2000 lb and over; Cold-finished bars, 2000 lb and over; [3]—500 to 9999 lb; [4]—1000 to 1999 lb; [5]—1000 lb and over; [7]—1500 lb to 3499; [8]—under ½ in.

Distributors Exert More Selling Pressure

Warehouses report improvement in sales since Labor Day and anticipate brisk business in fourth quarter, but consumers are ordering more conservatively

Cleveland District distributors report some improvement in order volume since Labor Day and anticipate brisk business going into fourth quarter though pressure from consumers is off noticeably and salesmen are again finding it necessary to be more than order-takers. Some warehousemen think that the tendency of consumers to order needs more conservatively, noted increasingly at the mill level, will serve to direct a substantial volume of business to them that might otherwise go direct to the mills.

Warehouse receipts from the mills continue to improve. Currently, overall stocks are estimated at about 90 per cent of the level of October, 1949.

Chicago Warehouses still experience a good demand for steel although business is not as strong as it was two months ago. Mill shipments to distributors have improved but some products still are inadequate in supply. Notably in short supply are wide flange beams and other heavy structurals.

Boston Warehouse sales are up this month, but volume is not back to the level of the first half. With inventories back to 80 per cent on the average, distributors are ordering to specification except for a few tight products.

New York—With more consumers aiming at inventory adjustment warehouse order volume is off. While there has been an improvement in demand this month, pressure on the distributors for steel is definitely not as heavy as it was earlier this year.

Philadelphia Distributors' greatest buying interest is in fast moving products and in filling holes in slow-moving sizes. They expect September business to be above that of August and new orders to keep coming in steadily, if cautiously, until mid-December and the yearend inventory pause. Extra reliance on warehouses is seen possible because of current business uneasiness and a desire not to tie up capital in forward ordering from mills.

St. Louis—Steel warehouse business is perking up a bit over July and August, probably because the vacation season is over. Stocks generally are up to an estimated 75 per cent of normal, with varieties and sizes fairly well balanced.

Better warehouse receipts from mills reflect the softening steel situation. At least two major warehouses here have added salesmen for the more aggressive merchandising demanded by competition. Some unheralded price trimming is under way on sheets and some other items.

Pittsburgh On all but the tightest items, warehouses are improving inventories while demand declines. "We're a long way from having a balanced inventory, but we're approaching it," a leading warehouseman reports.

No balance is in sight for structural and bar shapes and plates. In freer supply are cold-finished bars, stainless steel and alloy bars.

Birmingham — Warehouse shipments here remain brisk even though demand has tapered off generally in some specifications. This is generally attributed to the fact shipments to warehouses are still on the short side.

Los Angeles—Distributors' sales are steady at the August level. To put steel inventories, approaching 85 per cent of normal, into better balance, warehouses are generally placing orders for fourth quarter steel at rates in excess of sales.

San Francisco Volume is down a bit and there is considerably more competition, but warehouses as a whole, are not complaining. They still are enjoying a lively business. While physical volume of inventories has creeped up no warehouse in the territory has a full range of stocks.

Seattle—While the potential market is large, warehouse buying continues to drag, consumer tendency being to use current inventories.

Order Load On Sheet Mills Heavy

Strong demand continues to be encountered though consumer buying pressure is easing. Freer supply indicated in fourth quarter with urgency to order less pressing

Sheet and Strip Prices, Page 204 & 205

Boston—For the most part, order cutbacks on flat-rolled carbon stock are confined to tonnage placed originally for automobile assembly. Some stainless is included. Stamping shops supplying components are slower. This has opened capacity for more fourth quarter tonnage for other users.

Shipments are heavy and inventories with most sheet and narrow strip consumers will be in balance by end of fourth quarter. A possible exception is silicon strip.

New York—More hot-rolled sheet is being offered in this district, and with fabricators guarding against overbooking, pressure on sellers is diminishing correspondingly.

Philadelphia — Effective Sept. 11, Alan Wood Steel Co., Conshohocken, Pa., reduced hot-rolled carbon sheet and strip to a base of $4.05, Conshohocken.

Less hectic days are in store for sheet buyers. Extra tonnage in all grades will be forthcoming in the last three months of the year. More hot-rolled sheets will be turned out at the Fairless Works and cold-rolled sheets will start coming through.

Pittsburgh — Producers still can't match brisk demand for sheets in this area, although they are catching up slowly. Opinion places supply-demand balance in late fourth quarter.

Fabricators may soon get tonnage shipments from U. S. Steel's Fairless Works as well as quicker delivery from this area's mills.

Cleveland—Sheetmakers note some easing in demand pressure but order volume continues heavy and expectations are fourth quarter order books, at least so far as the larger mills are concerned, will be filled without difficulty. Some of the premium-price and less favorably situated producers are feeling contraction in buying more severely than the larger makers.

Chicago — Demand for hot-rolled carbon sheets continues strong in this area, perhaps more so than in some other districts, for this is a deficit area of steel capacity.

While there have been some order cancellations, they have been small and insignificant. Over-all demand still exceeds supply. Demand for galvanized sheets is good, partly because of the government's grain bin program. Also in good demand are enameling sheets.

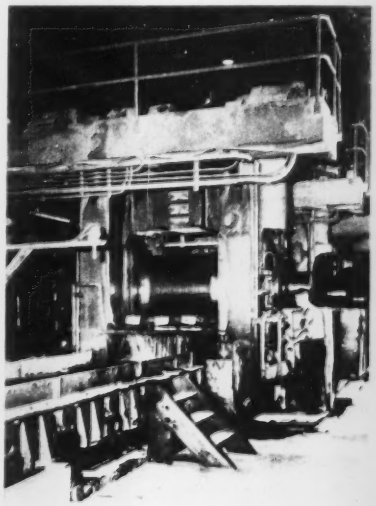
Conversion Steel . . .

Chicago—Rolling of steel on conversion contracts is expected to be completed by the end of October. For some weeks no new contracts for conversion rolling have been made. The end of this business came with the general decline in demand for steel.

Steel Bars . . .

Bar Prices, Page 204

Chicago—Demand for carbon bars is easing and demand for alloy bars is soft. The easing on carbon bars stems largely from reduced demands from the farm implement makers and from expectations of cuts in the government's projectile program. The easing extends into the larger sizes, which, until recently, have been in extremely strong demand. Smaller sizes of hot-rolled carbon bars have not been as hard to get as the larger sizes. Supply of cold-finished carbon bars, except in the large sizes, has been plentiful.



Hot Strip Mill Hums

This four-stand hot finishing train (delivery end) at Empire Steel Corp., Mansfield, O., is part of a complete hot-strip mill engineered by E. W. Bliss Co., Toledo, O. Thirty units were involved, ranging from bloomer and edger stands and four-high mills to run-out tables, shears and plate pilers

Helping take some of the pressure off bars is Wisconsin Steel Co., affiliate of International Harvester Co. Now that the farm implement business is slow International Harvester's demand on Wisconsin Steel is reduced, and the latter is making some of its bar capacity available on a selective basis to other consumers.

Cleveland — Demand pressure is easing gradually in the bar market. Producers will enter fourth quarter with substantial order backlogs but new business has not been developing in the former volume and tonnage will be more freely available in the closing three months of the year than has been the case for a long time past.

In general, consumption reportedly is holding at a high level but consumer ordering increasingly is reverting to former normal buying practice. Uncertainty with respect to the trend of business over coming months is inducing more caution in buying for stock and with the outlook for supply availability improving steadily the urgency for consumers to cover ahead is less and less in evidence.

Boston—Orders for cold-finished carbon bars for November and beyond are slower, notably smaller sizes. Alloys schedules for that month are filling. Cancellations on hot-rolled carbon bars have opened up some tonnage for fourth quarter. Converters are placing orders cautiously as stocks of cold-finished build up in more smaller sizes.

New York—Definite easing now is showing up in hot-rolled and cold-finished bars. Demand fall-off is most noticeable in small rounds from $\frac{3}{8}$ to 2 inches.

Belgian reinforcing bars are offered at $87 per metric ton, f.o.b. Antwerp, with sales reported as low as $78. Freight rate to New York is $12 per metric ton. Carbon bars are quoted at $87 with discounts up to $4; shapes are listed at $93 with discounts of $3.

Philadelphia — By the middle of November, barmakers think they will have enough steel to make deliveries when people want them.

Dearth of orders for small cold-finished bars is noticeable. Alloy bars are no supply problem at all. "Bar suppliers may preach shortage but they take care of all our orders," says one big user.

Early October deliveries on hot bars under 2-inches is possible and quotas are a thing of the past. Large bars call for negotiation, but extra tonnages can be had. The fuze program has hit the stretchout and the

shell program is expected to follow suit soon, easing the market further.

Pittsburgh—Demand remains low for alloy bars and cold-finished carbon bars in small sizes. Bars 1½-inches and larger are in short supply. Smaller-size bars are easy.

Semifinished Steel . . .

Semifinished Prices, Page 204

Chicago—The district steelmaking rate for the week ended Sept. 19 rose to 101 per cent of capacity, one point over the preceding week's revised rate.

Principal reasons for the slight rise are increases by Youngstown Sheet & Tube Co. and Wisconsin Steel Co. The latter company, an affiliate of International Harvester, was scheduled to operate at 71.2 per cent of capacity compared with a low mark of 59.8 per cent for the week ended Sept. 12.

Most of Wisconsin Steel's output goes into International Harvester's implements. Before the drop in the implement business was felt fully, Wisconsin Steel operated as high as 115 per cent of capacity early this year.

August Steel Output Sets Record

Month is seventh this year in which production exceeded 9 million tons. Operations, averaging 94.1 per cent, top July rate. Total 8 months' output greatest ever reported

New York—August was the seventh month this year in which steel production exceeded 9 million tons, reports the American Iron & Steel Institute. Actual output for the month was 9,401,000 tons of ingots and steel for castings, a production record for August and bettering the July total of 9,275,673 tons by 125,327 net tons. In March production exceeded 10 million tons for the first time in history.

Ingot operations averaged 94.1 per cent in August, an increase compared with 93.1 per cent in July. In 1952, when steel capacity was lower than this year, the furnaces would have had to operate at 102.2 per cent of 1952 capacity in order to produce as much steel as was turned out in August this year.

During the first eight months this year production totaled 76,622,609 net tons, the largest amount ever produced in a comparable period. Output in the first eight months last year, when operations were severely curtailed by the steel strike, totaled only 55.1 million tons. In the first eight months of 1951 production amounted to about 69.7 million ingot tons.

Steel production in the 12 months ended Aug. 31 this year amounted to 114.6 million tons, according to the Institute. This was far greater tonnage than ever produced in any previous 12 months. It was about 2¾ times greater than Russia's expected production this year, and compares with 107 million tons produced in the 12 months starting Apr. 1, 1951. The highest production in a calender year was 105.2 million tons in 1951.

	OPEN HEARTH		BESSEMER		ELECTRIC		TOTAL		Calculated weekly production (net tons)	No. of weeks in mos.
	Net tons	% of capacity	Net tons	% of capacity	Net tons	% of capacity	Net tons	% of capacity		
1953										
January	8,841,670	101.4	240,000	88.9	706,083	81.2	9,897,962	99.1	2,234,303	4.43
February	7,939,299	100.8	329,389	92.6	664,091	84.6	8,932,779	99.1	2,233,195	4.00
March	9,050,773	103.7	354,710	90.0	762,615	87.7	10,168,098	101.8	2,295,282	4.43
1st Qtr.	25,831,751	102.0	1,034,299	90.4	2,132,789	84.5	28,998,839	100.0	2,254,964	12.86
April	8,493,909	100.5	334,605	87.7	717,024	85.2	9,545,538	98.7	2,225,067	4.29
May	8,925,163	102.3	354,577	90.0	717,340	82.5	9,997,080	100.1	2,256,677	4.43
June	8,394,502	99.4	332,060	87.9	677,917	80.5	9,404,479	97.2	2,192,186	4.29
2nd Qtr.	25,813,574	100.8	1,021,242	88.3	2,112,281	82.7	28,947,097	98.7	2,224,988	13.01
1st 6 Mo.	51,645,325	101.4	2,055,541	89.3	4,245,070	83.6	57,945,936	99.4	2,239,880	25.87
*July	8,316,342	95.5	324,068	82.1	635,263	73.2	9,275,673	93.1	2,098,569	4.42
†August	8,847,000	96.8	310,000	78.7	644,000	74.1	9,401,000	94.1	2,122,000	4.43
1952										
1st Qtr.	24,207,329	102.5	1,168,871	87.4	1,824,524	89.1	27,200,724	100.7	2,092,363	13.00
April	7,101,159	91.1	323,906	73.2	567,935	84.1	7,992,140	89.7	1,862,970	4.29
May	7,291,865	90.6	318,642	69.9	595,135	85.3	8,205,642	89.2	1,852,289	4.43
June	1,446,927	18.6	22,862	5.2	170,000	25.2	1,639,789	18.4	382,235	4.29
2nd Qtr.	15,839,951	67.0	664,510	49.6	1,333,070	65.1	17,837,571	66.0	1,371,066	13.01
1st 6 Mo.	40,047,320	84.8	1,833,381	68.5	3,157,594	77.1	45,038,295	83.4	1,731,576	26.01
July	1,347,587	16.8	2,999	0.4	277,859	39.9	1,627,446	17.7	368,200	4.42
August	7,599,888	94.4	309,361	67.8	490,476	84.6	8,499,725	92.4	1,918,674	4.43

Note: The percentages of capacity in 1953 are calculated on weekly capacities of 1,969,275 net tons open-hearth, 88,934 net tons bessemer and 196,250 net tons electric ingots and steel for castings, total 2,254,459 net tons; based on annual capacities as of Jan. 1, 1953, as follows: Open-hearth 102,677,980 net tons, bessemer 4,637,000 net tons, electric 10,232,490 net tons, total 117,547,470 net tons. The percentages of capacity operated in 1952 are calculated on weekly capacities of 1,816,637 net tons open-hearth, 102,926 net tons bessemer and 157,477 net tons electric ingots and steel for castings, total 2,077,040 net tons; based on annual capacities as of Jan. 1, 1952, as follows: Open-hearth 94,973,780 net tons; bessemer 5,381,000 net tons; electric 8,232,890 net tons; total 108,587,670 net tons.

*Revised.
†Preliminary figures, subject to revision.

Of the six ingot producers in this district, all but Wisconsin Steel and Inland Steel are operating above 100 per cent of capacity. Inland was scheduled for 97.8 per cent in the week ended Sept. 19.

Buffalo—Efforts to settle the wildcat strike of coke oven workers at Bethlehem's Lackawanna plant were futile last week and the entire plant was inoperative with 32 open hearths and 7 blast furnaces down completely. Ingot operations in the district are estimated at 26 per cent of capacity which compares with 31.5 last week.

Los Angeles—Wild-cat strike for 48 hours at Kaiser Steel Corp., Fontana Works, closed down 9 open-hearth and 3 blast furnaces, and cost 11,000 tons of ingots.

Plates . . .

Plate Prices, Page 204

Philadelphia—Central Iron & Steel Co., Harrisburg, Pa., reduced plate prices from $6.95 to $4.95, effective Sept. 11. The new base still leaves a premium of $8 per ton, comparing with a base price of $4.55 Claymont, and Conshohocken, Pa., $4.35 Coatesville, and $4.10 at Sparrows Point and Pittsburgh.

Higher priced midwest producers are expected to be less of a market factor here than ever.

The plate market shows soft spots, but the general tone continues good. Demand still exceeds supply as a rule.

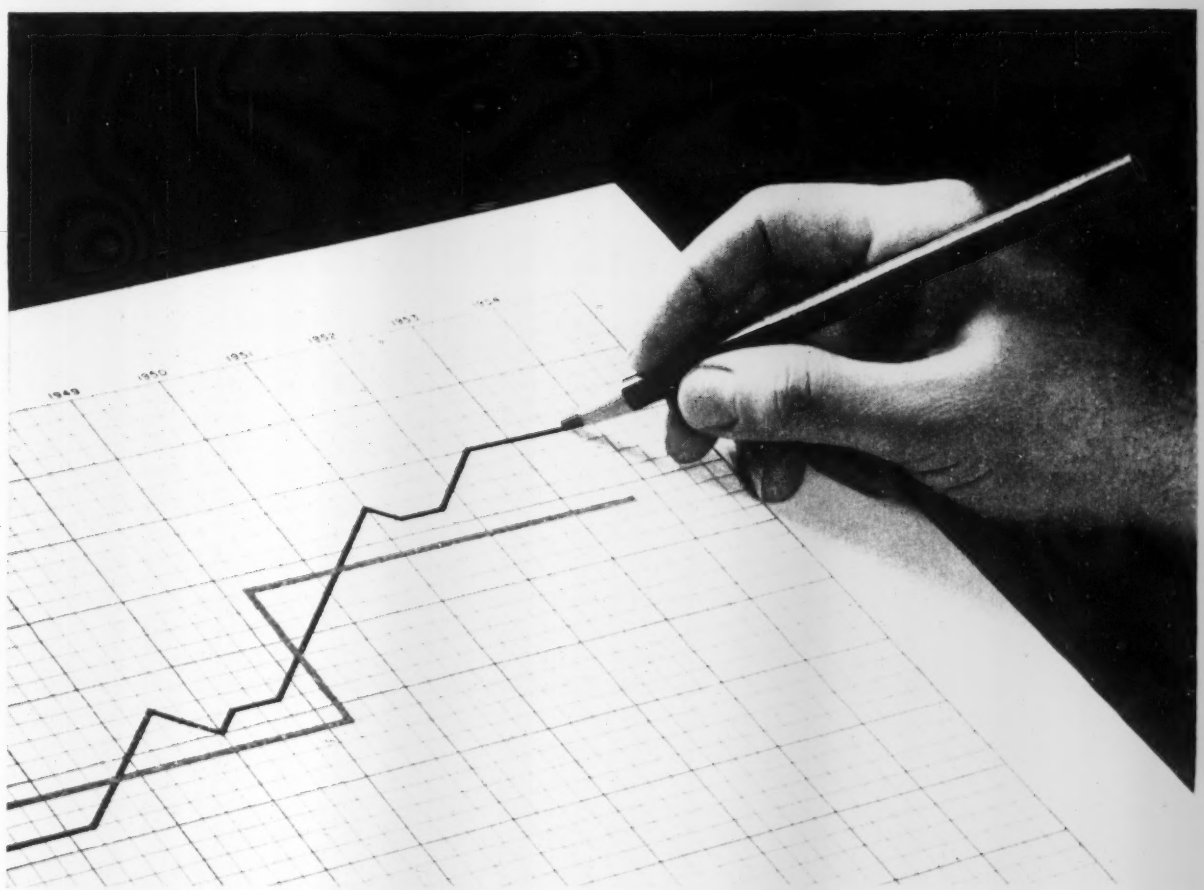
Boston—Cutbacks in plates are limited mostly to military requirements, including low alloy high tensile grades. Heavy and wide carbon plates are in good demand with some pressure for delivery, but narrow stock, 6 to 36-inches, is available in larger volume for November delivery.

New York—Mills are booked up through rest of the year on light wide plates. There's room in fourth quarter books for some narrow sizes. Heavy plates are in a position somewhere between the two from a demand-supply standpoint. Tank fabricators can't get enough light wide plates because strip mills are getting out of the plate market.

Pittsburgh—The few producers of heavy plates continue to enjoy an enviable position. All types are in short supply. Light plates show no signs of loosening.

Chicago—Demand for carbon steel plates exceeds supply. One producer thinks it may have an order carryover on wide plates into the first quarter of 1954. Among consumers needing more plates are tank and structural fabricators. Even builders of railroad freight cars exert a good demand for plates.

Birmingham—Plates remain in



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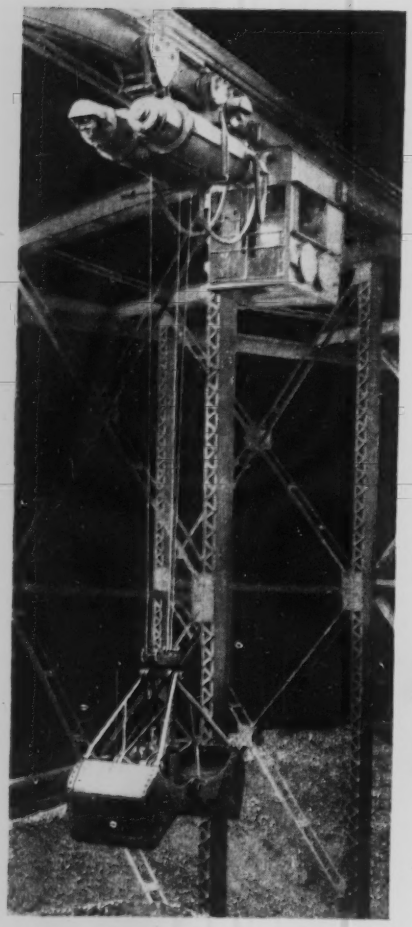

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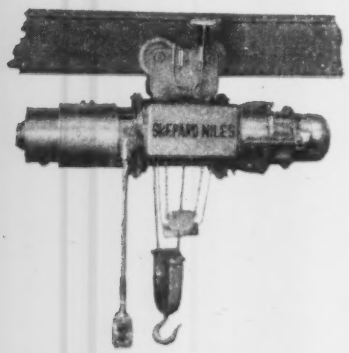

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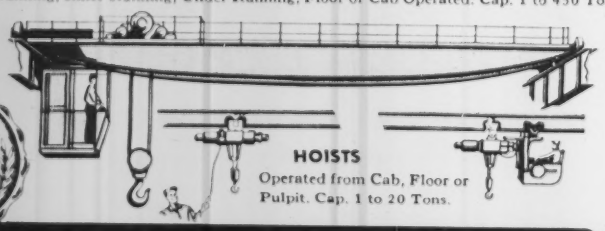

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strong demand in this section even though car building backlogs have dwindled considerably and the Bessemer plant is looking for additional business.

Seattle—Small plate fabricating shops are having difficulty competing for business because of the continued shortage of plates. No improvement in supply conditions is expected until the first quarter of next year. Several sizable awards are pending, including 1750 tons for a Navy tank installation at Manchester, Wash., and 2000 tons or more for fuel tank jobs at defense centers in Washington state and Alaska.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 204

Seattle—The rolling mills in this area continue to operate at peak capacity and prospects for the remainder of 1953 are considered favorable. Small tonnages total considerable volume and backlogs are about static. Road projects in the Pacific Northwest and Alaska construction are still calling for sizable shipments of reinforcing bars. Bethlehem Pacific Coast Steel Corp. booked 1000 tons of reinforcing for the Chandler pumping plant, Columbia Basin project.

Tubular Goods . . .

Tubular Goods Prices, Page 207

Pittsburgh — Seamless tubing demand has slackened noticeably from early third quarter. Adjustments in buyers' schedules and inventory control is reflected in declining orders. Distributors are more selective, rounding out their holdings and ordering less of the freer items.

Boston—Light wall electric tubing prices are soft. Surplus carbon volume produced by district consumers beyond their own requirements are offered below listed prices and several outside this district are meeting them on a delivered basis.

New York — Reflecting reduction in prices of zinc, the United States Steel Export Co., subsidiary of U. S. Steel Corp., announced the following new export base prices with freight included to New York, Philadelphia and Baltimore: American standard pipe, T & C, galvanized buttweld 2½ and 3-in., minus 14.06 per cent discount; galvanized seamless 2-in., plus 5.69 per cent; 2½-in., plus 3.44 per cent; 3-in., plus 0.94 per cent; 3½ and 4-in., minus 0.56 per cent; 5-in., plus 0.19 per cent; 6-in., minus 2.31 per cent.

Seattle—Cast iron pipe demand is seasonally slow but sales agencies, now able to give 30 to 45-day deliveries, are in an improved competitive position.

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Application of Gulf No-Rust C (polar type) to three-stage 22-station progressive die, which lances, forms ears, pierces, and forms anchors on automobile parts in one stroke of the press.

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Wire . . .

Wire Prices, Page 206

Chicago — Slight improvement in demand for merchant wire products, particularly barbed wire and nails, is noted in this area. For some time, demand for merchant wire products has been slack. Remaining soft are poultry netting, baling wire and woven wire fence. Demand for manufacturers wire is fair, except from the agricultural implement makers whose business is slow.

Boston—Wire mill schedules for October are filled to capacity on relatively few finished products. Consumers are not adhering to lead-time as most are trying to get inventories down to a 30-day basis. This includes cold-heading and spring wire.

Tin Plate . . .

Tin Plate Prices, Page 206

New York — United States Steel Export Co., subsidiary of U. S. Steel Corp., recently announced the following export base prices on tin mill products, freight included to New York, Philadelphia and Baltimore: Coke tin plate, 1.25 pound coating, $9.58 per base box; electrolytic tin plate, .25 pound coating, $8.26, base box; coated manufacturing terne plate, $8.60, base box; black plate, $7.38, base box.

Competition in tin plate from abroad, particularly British mills, is seen as a reason for snipping export prices on coated manufacturing terne plate, black plate and electrolytic tin plate 50 cents, and coke tin plate 51 cents per base box.

Pittsburgh — Producers who enjoyed the high summer rate of tin plate output now predict a fourth quarter drop as much as 40 per cent below third quarter operations.

Structural Shapes . . .

Structural Shape Prices, Page 204

Philadelphia — Structural fabricating shops report mill shipments have improved no more than 10 per cent in the past six months. Recently, standard shapes and reinforcing bars have been coming in well, as have 42 and 48-inch mill sizes of wide flange beams. Inquiries are slower and deliveries seem to be more important to customers.

Business remains good but competition is sharpening on fabrication and erection, as exemplified by bidding on 730 tons for a John Wanamaker store in suburban Winwood.

Boston—Except for a shortage of wide-flanged material, fabricating structural shops are better off on plain shapes. More wide-flanged

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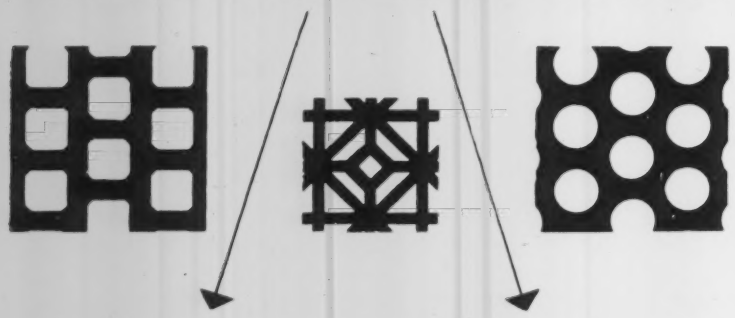

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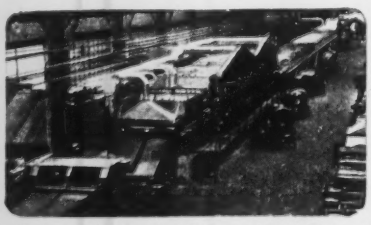

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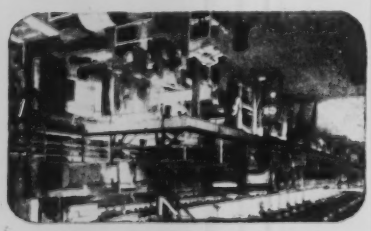

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beams are under allocation with producers in some cases limiting rolling of light weight sections on heavier mills.

New York—On fabricated structural work, 500 tons and under, competition is sharper with price a factor in placement of contracts. Prices on larger tonnages are firmer. While the supply of plates for continuous girder projects has improved, wide-flange beams are allocated with more mill tonnage involved.

Chicago—Structurals continue in strong demand. One producer is booked full for the fourth quarter and may have an order carryover into the first quarter of next year. However, inquiries from structural fabricators are lower now than they were a year ago, fabricators' backlogs reportedly being off about 10 per cent.

Pig Iron . . .

Pig Iron Prices, Page 204

Philadelphia—Possibility of freight absorption as a means of price shading in pig iron is talked of here as imports and the softening scrap market make themselves felt. Furnace inventories run about 60 days, and proximity of supply is a factor to encourage users. German iron is still coming in at $52 and large buyers are asking suppliers to meet the competition.

Readjustment in castings prices is also a subject for speculation.

Alan Wood Steel Co. reduced pig iron prices $2 per ton, effective Sept. 14, to $58 furnace for basic, $58.50 for No. 2 foundry, $59 for malleable, and $59.50 for bessemer. These are comparable to base prices at Bethlehem, Pa.

With a freight rate to Philadelphia of $1.66 before the 3 per cent federal tax, against $2.75 to Philadelphia from Bethlehem, Pa., Alan Wood for the first time in a long while has the price edge on domestic iron shipments into this city. In other words, the Swedeland producer is now quoting basic at $59.66 delivered Philadelphia. No. 2 foundry $60.16, malleable $60.66 and bessemer $61.16, as compared with $60.75, $61.25, $61.75 and $62.25, respectively, on shipments from Bethlehem.

Boston—Shipments are slightly higher this month with the melt unchanged except for a slight improvement at the smaller jobbing shops. Machine tool foundries are the most active and are melting nearer to capacity.

New York—Demand for pig iron is slack. Foundries are not melting to capacity in most cases and are reluctant to carry inventories over 30

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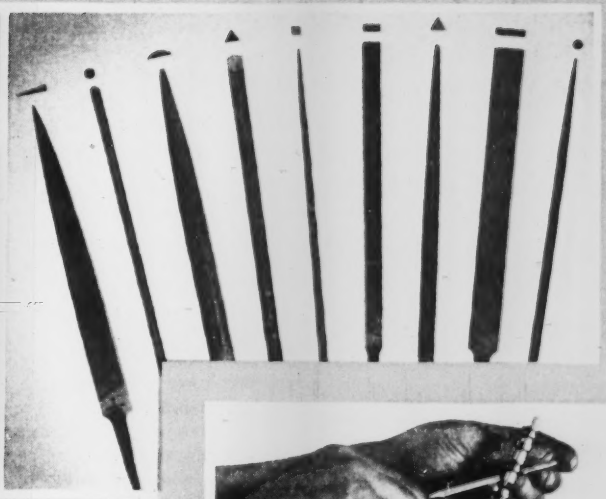

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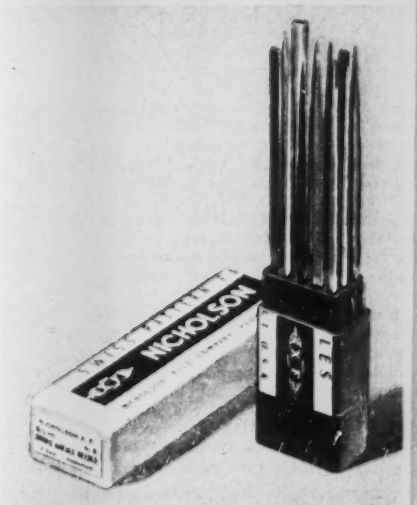

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days. To attain that goal some are not buying. There has been only slight improvement in demand for castings this month. Melt is below the second quarter level. Foreign iron is a more competitive factor, being offered freely from $52 to $55, f.o.b. dock.

While Alan Wood Steel Co. has reduced its pig iron prices $2 per ton to $58 furnace for basic, $58.50 for No. 2 foundry, $59 for malleable and $59.50 for bessemer, the same base prices are prevailing at Bethlehem, Pa. and the Bethlehem producer still has the edge on delivered prices at Newark, N. J., and New York. Alan Wood's rate into Newark is $3.5535 before 3 per cent federal tax, and into New York $5.46.25, both higher than the rates from Bethlehem.

The smaller of the two furnaces at Swedeland, out since early August for relining, is back in operation.

Buffalo — Uncertainty prevails in the merchant pig iron market here. Auto manufacturers continue to call for substantial tonnage. However, there are signs of some leveling off.

Pittsburgh — Inventory reduction by area consumers continues. Some consumers still have reduced operations and are using more pig iron than they order. A return to normal market activity is now expected in mid-October.

Cleveland — The foundries are taking in pig iron steadily but the merchant market is not under the pressure it was some time back. In fact, pig iron salesmen are out pressing for tonnage as has not been the case in a long time.

District furnaces are operating at capacity and no piling of iron on yards is reported. However, a report in the trade here last week was to the effect an Ohio river producer was banking one blast furnace because of heavy yard stocks of iron.

Chicago — Slight seasonal improvement in foundry operations has given a little upturn in sales of merchant pig iron. However, foundry operations average only 60 to 65 per cent of their peak level. A notable depressant to foundry operations in this area is the drop in farm implement output. Also contributing to lethargy are cutbacks in automobile production.

Foundries are reducing inventories of pig iron and coke, some of the shops aiming to get their stocks down as low as a 10 to 12-day supply.

Iron Ore . . .

Iron Ore Prices, Page 227

Cleveland — Weekly movement of iron ore from the head of the lakes continues in heavy volume. Ship-

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ments in the week ended Sept. 14 totaled 3,147,481 gross tons, the Lake Superior Iron Ore Association reports. This compares with shipments of 3,388,057 tons in the preceding week and with 3,216,197 tons in the corresponding week of last year.

Total shipments from the upper lakes in the shipping season to date now stand at 71,822,941 gross tons, only a little more than 28 million tons short of the 100 million ton 1953 season goal. Movement in the corresponding period of the 1952 shipping season was only 44,021,893 gross tons.

Scrap . . .

Scrap Prices, Page 230

New York—Brokers' buying prices continue to decline with business exceedingly dull, reflecting the disposition of consumers to further reduce their inventories. Actually there is so little trading that price changes are largely nominal.

Brokers' buying prices on No. 1 heavy melting and No. 1 bundles are nominally $29 to $30, on No. 2 heavy melting $27 to $27.50, on No. 2 bundles, $24 to $25, machine shop turnings, $15.50 to $16.50, and on low phos $32 to $33. Borings and short shovel turnings are nominally unchanged at $19 to $20 and $20 to $21 respectively. Prices on No. 1 cupola have dropped to $31 to $32 and on unstripped motor blocks to $21 to $22.

Cleveland—With trading at a virtual standstill the scrap market continues weak with prices off another $1 to $2 per ton. Current quotations are largely nominal in the absence of representative sales. Tonnage is moving to the mills on old contracts but no new buying is reported.

Meanwhile, while some stocks are accumulating in dealers' yards material is coming from manufacturing plants at a noticeably slower pace. Some market observers think the market is nearing bottom and that by next month prices will turn upward with resumption of mill buying, which, it is believed, will be necessary if consumers are to be protected over the winter.

Boston—Low steel scrap prices are not stimulating demand and new buying is slack. Ingot operations in this area are erratic, some mills producing near capacity one week and then falling off sharply the next.

Scrap inventories are substantial, notably No. 2 grades, and new buying is not up to current melt. No. 2 heavy melting and No. 2 bundles are slow and soft.

Buffalo—With three leading mill consumers out of the market scrap prices plunged up to $3.50 per ton. Hardest blow to the market is the tieup of Bethlehem's Lackawanna

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plant by strike. The area's second largest buyer has extended an embargo on shipments.

Although no new business is reported in steelmaking grades dealers readily admit prices are off $1 to $2. A new sale was reported of cupola cast at $33.50, a drop of $3.50.

Philadelphia—The scrap market pulse can hardly be felt as prices continue their toboggan ride and buyers remain out of the market for as long as 60 days. The low could be hit by the end of this month. Mills have fairly decent inventories at present, but some observers think they could be buying too little to their sorrow.

Certified Metal Abrasives
FOR USE IN BLAST CLEANING EQUIPMENT
SAMSON SHOT
ANGULAR GRIT
PITTSBURGH CRUSHED STEEL CO., PITTSBURGH, PA.
STEEL SHOT & GRIT CO., BOSTON, MASSACHUSETTS

Pittsburgh—Prices continue to drop, with scrap moving very slowly. Some industry representatives feel that prices have nearly ended their skid. No. 1 heavy melting is quoted at $40 to $41 with No. 2 heavy melting also down $1 to $36 to $37. Most cast iron grades and railroad scrap fell similarly.

Detroit—Quantity sales of scrap in this area are virtually at a standstill. Increases are not seen by observers in the near future with further decline in scrap prices indicated during the immediate period ahead. Prices quoted currently represent largely a "best guess" about a market which, for the moment, virtually does not exist.

Cincinnati—Local buying is at a standstill. All prices shown for the Cincinnati market are nominal, but are believed to be at a level which might encourage buying.

Youngstown—The scrap market continues in the doldrums here. Big consumers show little interest despite declining prices. Republic Steel Corp. and Sharon Steel Corp. are reported virtually out of the market, and Youngstown Sheet & Tube Co. is said to be buying only day-to-day requirements.

Scrap dealers are pessimistic. Prices are down to $42 to $43 for No. 1 heavy melting railroad scrap; $38 to $40 for No. 1 heavy melting; $37 to $38 for No. 1 bundles; $36 to $37 for No. 2 heavy melting and $32 to $34 for No. 2 bundles. Turnings are especially depressed, with little market for them.

Chicago—New sales of steelmaking and blast furnace grades of scrap are lacking, and gradually declining rates of steel production are tending to add to consumer disinterest in buying. However, scrap is moving in fulfillment of old orders.

Because of the absence of new buying prices are largely nominal, with observers lowering their estimates of what new sales would bring. Low rate of operations in the foundry industry is keeping the cast grades in the doldrums.

St. Louis—Mill disinterest in stockpiling for winter continues to hamper the scrap trade. The industry is awaiting next week's developments with interest, when expiring orders may point up the coming trend. Prices softened moderately last week.

Birmingham—Scrap brokers and dealers report the market "at a standstill" with hardly enough buying, especially of melting steel, to form a conclusive price pattern.

Meanwhile, supplies are drying up as rural areas refuse to ship at current low price levels. Inability to get metal is reported to have shut down several scrap yards and baling presses in the district. Rail lists continue to get lighter, and roads are having trouble disposing of material at what they consider fair prices.

Los Angeles—With foundry activity depressed seasonally, demand for scrap is weaker.

San Francisco—Steel scrap prices in this area have finally weakened after holding steady for weeks in the face of price declines elsewhere in the country. New posted prices are down $1 a ton across the entire range of steel scrap. Cast grades remain steady.

Seattle—The scrap market ranges from $31 to $33 for No. 1 heavy melting steel, $27 to $29 for No. 2. Oregon buyers are still paying top prices here but Bethlehem remains on the former price levels.

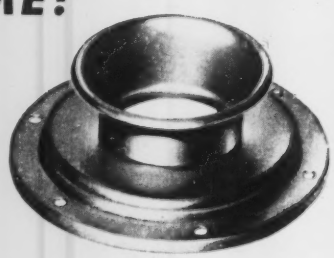
Ferroalloys . . .

Ferroalloy Prices, Page 224

Pittsburgh—U. S. Steel Corp. doubled ferromanganese production at its Duquesne Works last week, converting No. 1 blast furnace from iron to ferro. No. 1 is Duquesne's second blast furnace to change to ferro production. This furnace produces 300 tons daily, added to the present 320-ton daily output of No. 2 furnace.

SAVE TIME!

Investigate the use of low-cost WSM stamping *first!* Chances are, our engineers can design your component parts, to include these all-important qualities: *economy, strength* and *appearance!*



Why bother to produce stampings in your own plant at excessive cost, when WSM have an organization of 70 years experience at your disposal, equipped for fast service on light, heavy or deep drawn stampings.

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At your request, our representative will be glad to discuss your problems, without obligation.

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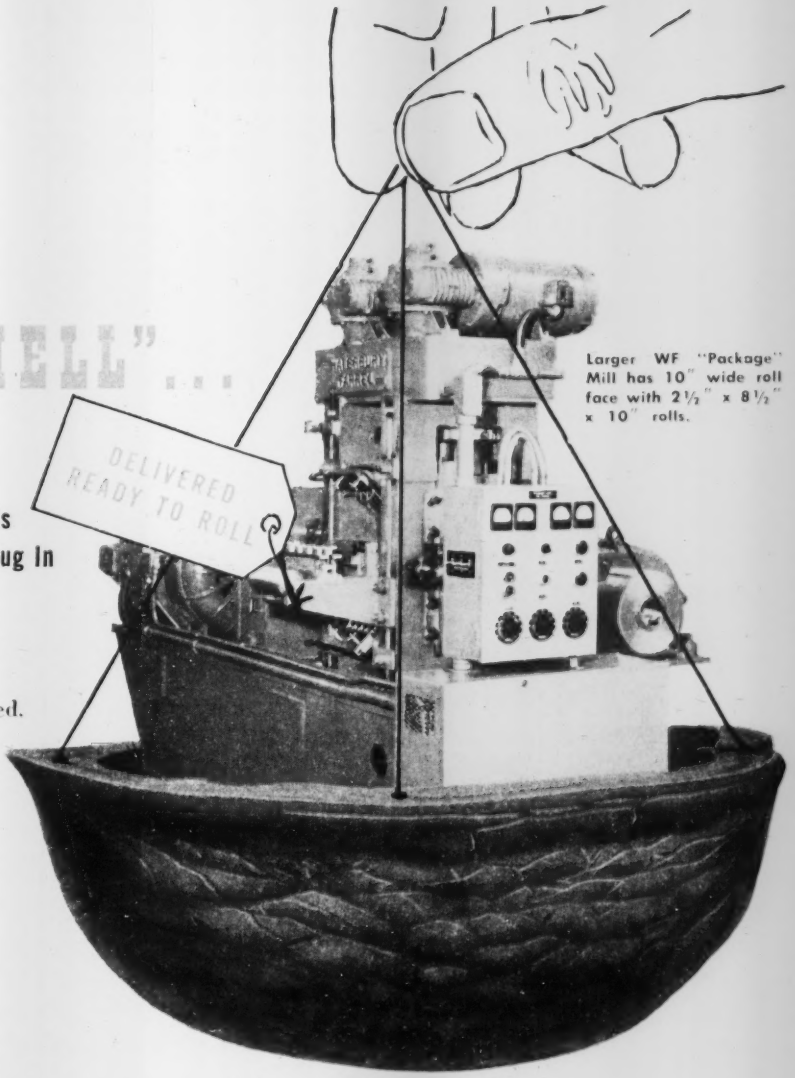
Waterbury Farrel's New, ONE-PIECE STRIP MILL "IN-A-NUTSHELL" . . .

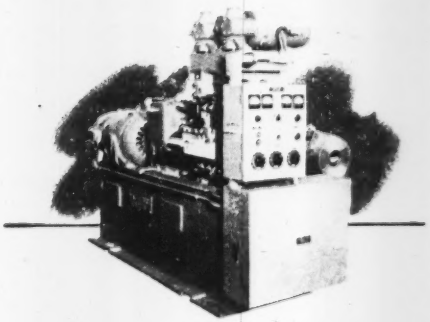


Larger WF "Package" Mill has 10" wide roll face with 2½" x 8½" x 10" rolls.

WF's 4-High "Package" Rolling Mills Are Compact, Low Cost, Ready To Plug In

You can start precision-rolling ferrous or non-ferrous strip as soon as you plug in the electrical connection.

This mill is completely self-contained. Drive, gear case, controls, lubrication system, winder and winder drive are assembled with the mill, itself, into a single, compact unit. When necessary, it can easily be moved in one piece to a new location.



Smaller WF "Package" Mill has 6" wide roll face with 1⅜" x 6½" x 6" rolls.

Mill frame of unit welded plate steel gives maximum strength and rigidity . . . assures greater accuracy and lasting alignment . . . alloy steel work rolls mounted in needle bearings . . . alloy steel back-up rolls drilled for water cooling, mounted in double row Timken bearings with tapered sleeve . . . independent power screwdowns . . . long and short roll necks and staggered couplings permit heavier construction for maximum torque capacities . . . lucite cover on welded steel gear case facilitates inspection . . . variable speed tension control drive, using AC power, cuts control cost and permits compact panel.

Contact Waterbury Farrel for complete details. No obligation.

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MILL MACHINERY—Rolling Mills: Strip, Rod, Wire Flattening, (For Ferrous and Non Ferrous Metals) • Also Slitters • Straighteners • Cut-off Saws • Coilers • Winders, etc. *WIRE MILL EQUIPMENT*—Continuous Wire Drawing Machines (Upright Cone and Tandem) • Wire Flattening Mills • Chain Draw Benches • Pointers Swagers • Bull Blocks • String-up Machines • Spoolers, etc. *COLD PROCESS BOLT & NUT MACHINERY*—Headers (all types) • Rivet Machinery • Trimmers • Thread Rolling Machines • Slotters • Nut Formers and Tappers, etc. *POWER PRESSES*—Crank, Cam and Toggle; also Rack and Pinion Presses • Eyelet Machines Multiple Plunger Presses • Horizontal and Hydraulic Presses, etc.

WF-17

CURRENT FERROALLOY QUOTATIONS

Prices as reported to STEEL

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton $86, Palmerton, Pa.; $87 Clairton and Duquesne, Pa.
(16 to 19% Mn) $84 per ton, Palmerton, Pa.; $85 per ton, Clairton and Duquesne, Pa.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $200, Clairton, Duquesne, Johnston and Sheridan, Pa.; add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.
(Mn 76-80%) 13.15c per pound of contained Mn, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; and Portland, Oreg.
(Mn 79-81%) Lump, $208 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 27.95c per lb of contained Mn, carload packed 28.7c, ton lots 29.8c, less ton 31.0c. Delivered. Deduct 0.5c for max, 0.15% C grade from above prices, 1c for max, 0.30% C, 1.5c for max 0.50% C, and 4.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85, C 1.5% max). Carload, lump, bulk 21.35c per lb of contained Mn, carload packed 22.1c, ton lot 23.2c, less ton 24.4c. Delivered. Spot, add 0.25c.

Manganese metal, 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 36.2c per lb of metal; packed, 36.95c; ton lot 38.45c; less ton lots 40.45c. Delivered. Spot, add 2c.

Electromanganese: Carload, 31.5c; ton lots 33.5c; 250 to 1999 lb, 35.5c. Premium for hydrogen-removed metal, 1.5c per pound, f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 11.4c per lb of alloy, carload packed, 12.15c, ton lots 13.05c, less ton 14.05c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max. Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%.) Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 24.75c per lb of contained Cr; c.l., packed 25.65c, ton lot 26.80c, less ton 28.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%) Contract, carload, lump, bulk, max. 0.025% C (simplex) 34.50c per lb contained Cr, 0.03% C 36.50c, 0.04% C 35.50c, 0.06% C 34.50c, 0.10% C 34.00c, 0.15% C 33.75c, 0.20% C 33.50c, 0.50% C 33.25c, 1% C 33.00c, 1.50% C 32.85c, 2% C 32.75c. Carload packed add 1.1c, ton lot 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High Carbon: (Cr 62-66%, C 5-7%) Contract, c.l. S M x D, bulk, 26.25c per lb contained Cr. Packed, c.l. 27.15c, ton 28.50c, less ton 30.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max.) Contract, carload, packed, S M x D, 18.35c per lb of alloy; ton lot 19.2c; less ton lot, 20.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max.) Contract, carload, lump, 4" x down and 2" x down, bulk, 25.75c per lb of contained chromium plus 12.4c per pound of contained silicon; 1" x down, bulk 25.90c per pound of contained chromium plus 12.60c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Ferrochrome Silicon, No. 2: (Cr. 36-39%, Si 26-29%, Al 7-9%, C 0.05% max.) 25.75c per lb of contained chrome plus 12.4c per lb of contained silicon plus aluminum 3" x down, delivered.

Chromium Metal: (Min 97% Cr and 1% Fe) contract, 1" x D; packed, max 0.50%, carload $1.12, ton lots $1.14, less ton $1.16. Delivered. Spot, add 5c. Prices on 0.10 per cent carbon grade, add 4c to above prices.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max, C 3-3.5% max). Contract, any quantity, $3.00 per lb of contained V. Delivered. Spot, add 10c. **Crucible-Special Grades** (V 35-55%, Si 2-3.5% max, C 0.5-1% max), $3.10. **Primos and High Speed Grades** (V 35-55%, 1.50% max, C 0.20% max) $3.20.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si, packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.40c per lb of contained Si, carload packed 14.0c, ton lot 15.45c, less ton 17.1c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.3c per lb of contained Si, carload packed 15.6c, ton lot 16.75c, less ton 18.0c. Delivered. Spot, add 0.8c.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 17.0c per lb of contained Si, carload packed 18.2c, ton lot 19.15c, less ton 20.2c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 97% Si and 1% max Fe) C.l. lump, bulk, regular 18.5c per lb of Si, c.l. packed 19.7c, ton lot 20.6c, less ton 21.6c. Add 0.5c for max, 0.10% calcium grade. Deduct 0.5c for max 2% Fe grade analyzing min 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.90c per lb of alloy, ton lots packed 11.30c, 20 to 1999 lb 11.65c, smaller lots 12.15c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max.). Contract, c.l. lump bulk 8.0c per lb of alloy, c.l. packed 8.75c, ton lot 9.5c, less ton 10.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y. freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3½ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.25c per lb of briquet, carload packed 16.95c, ton 17.75c, less ton 18.65c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.45c per lb or briquet, c.l. packaged 13.25c, ton lot 14.05c, less ton 14.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.65c, per lb of briquet, c.l. packaged 13.45c, ton lot 14.25c, less ton 15.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size — weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.95c per lb of briquet. Packed c.l. 7.75c, ton lot 8.85c, less ton 9.45c. Delivered. Spot, add 0.25c.
(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 7.1c. Packed c.l. 7.9c, ton lot 8.7c, less ton 9.6c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.ob. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 10,000 lb W or more, $4.35 per lb of contained W; 2000 lb W to 10,000 lb W, $4.45; less than 2000 lb W, $4.57, f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max. C 0.4% max). Contract, ton lot, 2" x D, $6.40 per lb of contained Cb, less ton $6.45. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx. Ta 20% approx, and Cb and Ta 60% min, C 0.30% max), ton lots, 2" x D, $4.75 per lb of contained Cb plus Ta, deld.; less ton lots $4.80.

Silicax Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed, 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, carload, packed, ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.50c per lb of alloy; ton lots 18.50c; less ton lots 20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 15c per lb of alloy; ton lots 16.50c; less ton lots 17.75c, f.o.b., Niagara Falls; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe) Lump, carload, bulk 14.50c. Packed c.l. 15.50, ton lots, 15.75c, less ton lots, 16.25c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, f.o.b. Langeloth, $1.32 in all sizes except powdered which is $1.41; Washington, Pa., furnace, any quantity $1.32.

Technical Molybdic-Oxide: Per lb, contained Mo, f.o.b. Langeloth, Pa., $1.14 in cans; in bags, $1.13, f.o.b. Langeloth, Pa.; Washington, Pa., $1.13.

IN THE production of stainless steels, the trend is toward closer controls of analysis through the use of quality master alloy ingot. Our ALLOYMET 2115 ingot (70% Nickel—10% Chrome) is fast becoming the standard of the industry as a basic raw material in the production of stainless steels.

When ALLOYMET 2115 is used in the melt, the analysis of the finished product is never in doubt. Compare this with a heat of 18-8 scrap . . . but no, there is no comparison. Scrap—no matter how good it may be—is still an imperfect commodity that is generated; not made to order. ALLOYMET 2115, on the other hand, is a master alloy made to rigid specifications under the supervision of trained metallurgists who know the needs of the steel industry.

Steel producers are rapidly learning that to use master alloys in the place of scrap costs so very little more. Prove this by your own use.

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JIG GRINDING ACCURACY *guaranteed**

INFINITE CONTROLLED SPEEDS 30,000 TO 65,000 R. P. M.

Easily connect jig grinder to jig borer or mill

Then you can finish grind in hardened steel to "tenths" . . . jig grind dowel holes square with a ground base . . . move location of holes in hardened steel blocks . . . jig grind interchangeable holes in hardened sections . . . grind small holes with diamond impregnated mandrels . . . grind contours and relief with tungsten carbide burrs . . . grind radii in die sections . . . eliminate jig bushings in tools where close spacing is essential.

Other infinitely controlled air driven spindle applications

Place spindle on most any machine. Use it for finishing contours on hardened steel working surfaces . . . burring or milling die castings . . . routing wood contours . . . carbide milling or finishing slots . . . finishing holes in hardened steel to "tenths" . . . grinding with diamond wheels, carbide burrs, or diamond impregnated mandrels.

Advantages—10 micro finishes using carbide mills . . . 6 micro finishes using mounted points, operates at any angle . . . air driven, air cooled, overheating prevented . . . speed controlled at optimum point . . . 3 3/16" long motor uses little working space . . . By controlling speed at any point you abolish need for many constant speed spindles.

For immediate quotation please state machine tool application. Get this manual of photos showing operations Vulcanaire performs.

*Dependably accurate to "tenths"

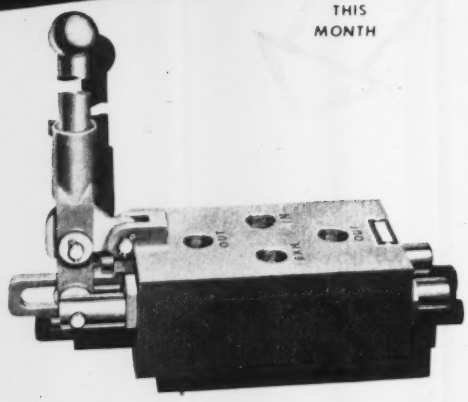
Vulcanaire

It's built by toolmakers for toolmakers

VULCAN TOOL CO., 799 LORAIN, DAYTON 10, OHIO

Quick-As-Wink AIR AND HYDRAULIC Control Valves

FEATURE THIS MONTH



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For line pressures up to 5000 psi

● Unsurpassed for efficient trouble-free service controlling single or double acting hydraulic cylinders and other important high pressure hydraulic circuits. Positive, fast acting. All parts are in pressure balance, eliminating any tendency to creep or crawl. Machined steel housings, with chrome plated and polished stainless steel plungers. Self sealing U-packers. Metal valving rings take the impingement of the liquid, minimizing wear on the packings. ½" to 1½" sizes. Also available in pilot operated designs; sizes to 4". Write for details.

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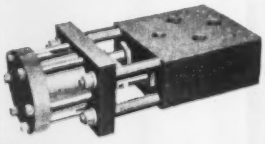
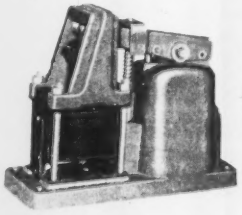


PILOT CYLINDER OPERATED HYDRAULIC VALVES

Two position valves 1½" to 4" sizes for line pressures from 1000 to 5000 psi. Valve is placed close to the work and operated from a central control point with an easy to handle air valve avoiding operator fatigue.



SOLENOID OPERATED AIR VALVES

Widely used for controlling single and double acting air cylinders, clutch and brake controls, etc. Solenoid is directly connected to valve operating mechanisms. ⅜" to 1½" sizes. 2-way, 3-way and 4-way actions.

For Fully Descriptive Data Sheets Write

C. B. HUNT & SON, Inc.

Hand, Foot, Lever, Cam, Pilot, Diaphragm and Solenoid Control Valves

1913 EAST PERSHING STREET • SALEM, OHIO

ORES-COKE-REFRACTORIES

Prices as reported to STEEL; changes shown in italics.

ORES

Lake Superior Iron Ore

(Prices effective July 1, 1953, and thereafter; gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$10.30
Old range nonbessemer	10.15
Mesabi bessemer	10.05
Mesabi nonbessemer	9.90
Open-hearth lump	11.15
High phosphorus	9.90

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon which were in effect on June 24, 1953, and increases or decreases after such date are for buyer's account.

Eastern Local Iron Ore

Cents per unit del. E. Pa.

Foundry and basic 56-62% concentrates contract 17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	nom.
Long-term contract	22.00
North African hematites (spot)	24.00-26.00
Brazilian iron ore, 68-69% (spot)	25.00

Tungsten Ore

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$55.00
Domestic scheelite, mine	63.00

Manganese Ore

Manganese, 48% nearby, $1.18-1.21 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 90-93c

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$40.00-$42.00
48% 3:1	44.00-46.00
48% no ratio	32.00-34.00

South African Transvaal

44% no ratio	$27.00-28.00
48% no ratio	34.00-35.00

Brazilian

44% 2.5:1 lump	nom. $32

Domestic

(Rail nearest seller)

48% 3:1	$39.00

Molybdenum

Sulphide concentrates per lb. molybdenum content, mines	$1.00

REFRACTORIES

Fire Clay Brick

High-Heat Duty: Pueblo, Colo., $89.00; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lochhaven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., Woodbridge, N. J., $109.00; Salina, Pa., $114.00; Niles, O., $120; Los Angeles, Pittsburg, Calif., $132.30.

Silica Brick

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $115.00; Hays, Pa., $120.00; Niles, O., $123; E. Chicago, Ind., Joliet, Rockdale, Ill., $125.00; Cutler, Utah, $116.55, Los Angeles, $122.85.

Insulating Fire Brick

2300° *F:* Massillon, O., $178.50; Clearfield, Pa., $197.50; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $186.90.

Ladle Brick

Dry Pressed: Bessemer, Ala., $64.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Wellsville, O., $77.50; Mexico, Mo., $73.50; Clearfield, Pa., Portsmouth, O., $83; Perla, Ark., $109.00; Los Angeles, $110.25; Pittsburg, Calif., $111.30.

Sleeves

Reesdale, Pa., $139.70; Johnstown, Pa., $140.00; Clearfield, Pa., $148.50; St. Louis, $151.80; Athens, Tex., $155.00.

Nozzles

Reesdale, Pa., $223.50; Johnstown, Pa., $229.20; Clearfield, Pa., $241.40; St. Louis, $247.10; Athens, Tex., $247.70.

Runners

Reesdale, Pa., $174.00; Johnstown, Pa., $177.80; Clearfield, Pa., $185.50; St. Louis, $187.30; Athens, Tex., $191.80.

High-Alumina Brick

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $179.00; Danville, Ill., $169.30.
60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $223.00; Danville, Ill., $213.20.
70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $255.00; Danville, Ill., $258.00; Clearfield, Pa., $252.

Dolomite

Domestic, dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, Pa., Millville, W. Va., Millersville, Martin, Gibsonburg, Woodville, O., $13.75; Thornton, McCook, Ill., $13.85; Dolly Siding, Bonne Terre, Mo., $13.65; Narlo and Bettsville, O., $14.50.

Magnesite

Domestic, deadburned bulk; Luning, Nev., $38.

METALLURGICAL COKE

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.50-15.00
Connellsville, foundry	16.50-17.00
New River foundry	20.80
Wise county foundry	15.95
Wise county, furnace	15.20

Oven Foundry Coke

Kearney, N. J. ovens	$24.00
Everett, Mass., ovens	
New England, del.	*26.00
Chicago ovens	24.50
Chicago, del.	26.00
Terre Haute, ovens	24.05
Milwaukee, ovens	25.25
Indianapolis, ovens	24.25
Chicago, del.	28.12
Cincinnati, del.	25.85
Painesville, O., ovens	25.50
Cleveland, del.	27.43
Erie, Pa., ovens	25.00
Birmingham, ovens	21.65
Cincinnati, del.	26.58
Lone Star, Tex., ovens	18.50
Philadelphia, ovens	23.95
Swedeland, Pa., ovens	23.85
St. Louis, ovens	
St. Louis, del.	26.00
St. Paul, ovens	23.75
Portsmouth, O., ovens	24.00
Cincinnati, del.	26.62
Detroit, ovens	25.50
Detroit, del.	26.50
Buffalo, del.	28.08
Flint, del.	28.23
Pontiac, del.	27.06
Saginaw, del.	28.58

*Or within $4.55 freight zone from works.

COAL CHEMICALS

Spot, cents per gallon, ovens

Pure benzol	36.00
Toluol, one deg.	30.00-33.00
Industrial xylol	30.00-33.50

Per ton, bulk, ovens

Sulphate of ammonia	$44-45
Birmingham area	$49.50

Cents per pound, ovens

Phenol, 40 (carlots, nonreturnable drums)	17.25

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Metallurgical grades, f.o.b. shipping point, in Ill., Ky. net tons, carloads, effective CaF_2 content 72.5%, $44; 70%, $42.50; 60%, $38. Imported, net ton, duty paid, metallurgical grade, $35-$36.

ELECTRODES

(Threaded, with nipples, unboxed f.o.b. plant)

Inches Diam.	Length	Cents per lb
GRAPHITE		
17,18,20	60,72	17.85
8 to 16	48,60,72	17.85
7	48,60	19.57
6	48,60	20.95
CARBON		
35,40	110	8.03
30	65,84,110	8.03
24	72 to 104	8.03
17 to 20	34,90	8.03

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Thickness:	3/8"	3/8"	1/2"	3/8"	1/2"	3/4"

Other sizes available on request.

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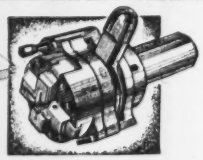

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Whitehall, Palm Beach, Fla.
Samoset, Rockland, Me.

Fasteners . . .

Bolt, Nut, Rivet Prices, Page 207

Cleveland — Industrial fastener makers report demand holding up surprisingly well, some noting an improvement in buying since the end of the vacation season. In general, however, pressure is not what it was some time back, this partly being attributed to increasing tendency of consumers to order more cautiously with supply improved and the business outlook uncertain.

Much the same market situation prevails with respect to wrought washers as with bolts, nuts, rivets, screws, etc. Demand is reported at a satisfactorily high level with consumers tending to be more cautious in forward buiyng.

Rails, Cars . . .

Track Material Prices, Page 207

San Francisco — Southern Pacific Co. has ordered an additional 1250 box cars, lifting the number of freight cars placed in service or still on order since the end of World War II. About 3500 freight cars remain to be delivered on previous orders. The newest lot of freight cars of 50-foot length will be built in Southern Pacific's shops in Sacramento, Calif.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

585 tons, bridge, Wyoming county, Pa., I.R 479 (Sec. 7); Reed & Kuhn, general contractors, to Pine Brook Iron Works, Wilkes-Barre, Pa.

535 tons, two state bridges, New Castle-Portsmouth, N. H., to Bethlehem Steel Co., Bethlehem, Pa.; Landers & Griffin, Inc., Portsmouth; general contractor; also 225 tons, steel bearing piles.

500 tons or more, slide gates, etc., Lucky Peak dam, to Pacific Coast Engineering Co., Alameda, Calif., by U. S. Engineer, Walla Walla, Wash.; bids opened July 23.

STRUCTURAL STEEL PENDING

6300 tons, rebids on car repair shop, Hollidaysburg, Pa., Pennsylvania railroad; design revised requiring extra tonnage; due Sept. 29.

6000 tons, office building, 300 Park Ave., New York; pending.

3500 tons, hospital, Newark, N. J.; re-advertised.

3000 tons, hospital, Welfare Island, New York; pending.

3000 tons, bridge superstructure, Westfield river, West Springfield, Mass.; bids postponed to Sept. 29.

1500 tons, alert hangars, Westover Field, Chicopee, Mass.; bids to U. S. Engineer, Boston.

600 tons, Army depot warehouse, Ft. Richardson, Alaska; Schmid & Lewis, Seattle, low $1,350,767, to U. S. Engineer, Seattle.

135 tons, bridge approaches, Agawam, Mass.; Henley-Lundgren Co., Shrewsbury, Mass., low.

330 tons, also 55 tons reinforcing, Washington state bridge, Watcom county; A. V. Phillips, Seattle, low $399,043.

300 tons, state highway bridge, Bedford, Mass.; bids Sept. 22, Boston.

275 tons, state highway bridge, over D. L. & W. railroad, Newark, N. J.; bids Sept. 29, Trenton.

230 tons, building, General Electric Supply Co., Philadelphia, due Sept. 15.

(Please Turn to Page 232)

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IRON AND STEEL SCRAP

Consumer prices, per gross ton, except as otherwise noted, including b oker's commissions, as reported to STEEL. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Sept. 17	$37.50
Sept. 10	38.67
Aug. avg.	43.40
Sept. 1952	43.00
Sept. 1948	43.33

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer plant)

No. 1 heavy melting	*40.00-41.00*
No. 2 heavy melting	*36.00-37.00*
No. 1 bundles	*40.00-41.00*
No. 2 bundles	*34.00-35.00*
No. 1 busheling	*40.00-41.00*
Machine shop turnings	25.00-26.00
Mixed borings, turnings	*27.00-28.00*
Short shovel turnings	29.00-30.00
Cast iron borings	28.00-29.00
Cut structurals	*45.00-46.00*
Heavy turnings	*37.00-38.00*
Punchings & plate scrap	*45.00-46.00*
Electric furnace bundles	*42.00-43.00*

Cast Iron Grades

No. 1 cupola	*40.00-41.00*
Charging box cast	*39.00-40.00*
Heavy breakable cast	*37.00-38.00*
Unstripped motor block	34.00-35.00
No. 1 machinery cast	48.00-49.00

Railroad Scrap

No. 1 R.R. heavy melt	*42.00-43.00*
Rails, 2-ft and under	51.00-52.00
Rails, 18 in. and under	*52.00-53.00*
Rails, random lengths	47.00-48.00
Railroad specialties	*46.50-47.50*

CLEVELAND

(Delivered consumer plant)

No. 1 heavy melting	*$3.00-$4.00*
No. 2 heavy melting	*$0.00-$1.00*
No. 1 bundles	*$3.00-$4.00*
No. 2 bundles	*28.00-29.00*
No. 1 busheling	*$3.00-$4.00*
Machine shop turnings	*19.00-20.00*
Mixed borings, turnings	*24.00-24.00*
Short shovel turnings	*24.00-24.00*
Cast iron borings	*24.00-24.00*
Low phos.	38.00-39.00
Alloy free, short shovel turnings	27.00-28.00
Electric furnace bundles	*$8.00-$6.00*

Cast Iron Grades

No. 1 cupola	41.00-42.00
Charging box cast	39.00-40.00
Stove plate	40.00-41.00
Heavy breakable cast	35.00-36.00
Unstripped motor blocks	25.00-26.00
Brake shoes	35.00-36.00
Clean auto cast	42.00-43.00
No. 1 wheels	37.00-38.00
Burnt cast	32.00-33.00
Drop broken machinery	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	*40.00-41.00*
R.R. Malleable	45.00-46.00
Rails, 3-ft. and under	51.00-52.00
Rails, 18 in. and under	52.00-53.00
Rails, random lengths	44.00-45.00
Cast steel	43.00-44.00
Railroad specialties	46.00-47.00
Uncut tires	45.00-46.00
Angles, splice bars	46.00-47.00
Rails, rerolling	*49.00-50.00*

YOUNGSTOWN

(Delivered consumer plant)

No. 1 heavy melting	*$6.00-$7.00*
No. 2 heavy melting	*$4.00-$5.00*
No. 1 bundles	*$6.00-$7.00*
No. 2 bundles	*$0.00-$1.00*
Machine shop turnings	*20.00-21.00*
Short shovel turnings	*25.00-26.00*
Cast iron borings	*25.00-26.00*
Low phos	*43.00-44.00*
Electric furnace bundles	*39.00-40.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*40.00-41.00*

PHILADELPHIA

(Delivered consumer plant)

No. 1 heavy melting	*$6.00-$7.00*
No. 2 heavy melting	*$2.50-$3.50*
No. 1 bundles	*$6.00-$7.00*
No. 2 bundles	*$1.00-$2.00*
No. 1 busheling	*$6.00-$7.00*
Electric furnace bundles	*$8.00-$9.00*
Machine shop turnings	*23.00-24.00*
Mixed borings, turnings	*26.00-27.00*
Short shovel turnings	*27.00-28.00*
Structurals & plate	*41.00-42.00*
Heavy turnings	*$6.00-$7.00*
Couplers, spring, wheels	*41.00-45.00*

Cast Iron Grades

No. 1 cupola	36.00-37.00
Charging box cast	*nom.*
Heavy breakable cast	*$8.00*
Unstripped motor blocks	*29.00-30.00*
Drop broken machinery	*41.00-44.50*

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*29.00-30.00*
No. 2 heavy melting	*27.00-27.50*
No. 1 bundles	*29.00-30.00*
No. 2 bundles	*24.00-25.00*
Machine shop turnings	*15.50-16.50*
Mixed borings, short turnings	19.00-20.00
Low phos. (structural & plate)	*42.00-43.00*
Short shovel turnings	20.00-21.00

Cast Iron Grades

No. 1 cupola	*41.00-42.00*
Unstripped motor blocks	*24.00-22.00*

DETROIT

No. 1 heavy melting	34.00-35.00
No. 2 heavy melting	*26.00*
No. 1 bundles	*34.00-35.00*
No. 2 bundles	*26.00*
No. 1 busheling	33.00-34.00
Machine shop turnings	*15.00*
Mixed borings turnings	*15.00*
Short shovel turnings	17.00
Punchings & plate scrap	37.00-38.00

Cast Iron Grades

No. 1 cupola	43.00
Charging box cast	34.00-35.00
Stove plate	34.00-35.00
Heavy breakable	29.00-30.00
Unstripped motor blocks	30.00
Clean auto cast	42.00-43.00
Malleable	44.00

CINCINNATI

(Brokers' buying prices)

No. 1 heavy melting	*$5.00-$6.00*
No. 2 heavy melting	*$2.00-$3.00*
No. 1 bundles	*$5.00-$6.00*
No. 2 bundles	*29.00-30.00*
No. 1 busheling	*$5.00-$6.00*
Machine shop turnings	*16.00**
Mixed borings, turnings	*19.00**
Short shovel turnings	*20.00**
Cast iron borings	*19.00**

Cast Iron Grades

No. 1 cupola	*43.00*
Charging box cast	*37.00*
Heavy breakable cast	*36.00*
Drop broken machinery	*47.00*

Railroad Scrap

No. 1 R.R., heavy melt.	*39.00*
Malleable	47.00
Rails, 18 in. and under	*52.00*
Rails, random lengths	46.00

*F.o.b. shipping point.

CHICAGO

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	30.00-32.00
No. 1 factory bundles	*$4.00-$5.00*
No. 1 dealer bundles	34.00-35.00
No. 2 bundles	29.00-30.00
No. 1 busheling	*$4.00-$5.00*
Machine shop turnings	*15.00-17.00*
Mixed borings, turnings	*16.00-18.00*
Short shovel turnings	*16.00-18.00*
Cast iron borings	*16.00-18.00*
Cut Structurals, 3 ft	*37.00-38.00*
Punchings & plate scrap	41.00-43.00
Electric furnace bundles	*39.00-40.00*

Cast Iron Grades

No. 1 cupola	34.00-36.00
Stove plate	32.00-34.00
Unstripped motor blocks	31.00-33.00
Clean auto cast	41.00-43.00
Drop broken machinery	40.00-42.00

Railroad Scrap

No. 1 R.R. heavy melt	37.00-38.00
R.R. Malleable	*40.00-42.00*
Rails, 2-ft and under	*46.00-48.00*
Rails, 18 in. and under	*47.00-48.00*
Angles, splice bars	*44.00-46.00*
Rails, rerolling	51.00-53.00

BIRMINGHAM

No. 1 heavy melting	26.00-26.50
No. 2 heavy melting	24.00-24.50
No. 1 bundles	26.00-26.50
No. 2 bundles	22.00-22.50
Machine shop turnings	19.50-20.50
Short shovel turnings	21.50-22.50
Cast iron borings	17.00-17.50
Cut structurals	nom.
Electric furnace bundles	nom.

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	41.00-42.50
Charging box cast	39.00-31.00
Stove plate	38.00-39.00
Bar crops and plate	38.00-39.00
Cut structurals	36.00-37.00
Heavy breakable cast	30.00-31.00
Unstripped motor blocks	34.00-35.00
No. 1 wheels	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	nom.
Rails, 2-ft and under	42.00-43.00
Rails, random lengths	39.00-40.00
Angles, splice bars	45.00-46.00
Rails, rerolling	46.00-47.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	34.00-35.00
No. 2 heavy melting	29.00-31.00
No. 1 bundles	*$2.00-$3.00*
No. 2 bundles	25.00-26.00
Machine shop turnings	15.00-16.00
Short shovel turnings	*17.00-18.00*

Cast Iron Grades

No. 1 cupola	*38.00-39.00*
Charging box cast	*29.00-30.00*
Heavy breakable cast	29.00-30.00
Unstripped motor blocks	29.00-30.00
Brake shoes	*38.00-39.00*
Clean auto cast	38.00-40.00
Burnt cast	29.00-30.00

Railroad Scrap

Malleable	42.00-43.00
Rails, 18-in. and under	47.00-48.00
Rails, random lengths	40.00-42.00
Uncut tires	*41.00-42.00*
Angles, splice bars	*42.00-43.00*
Rails, rerolling	42.00-43.00

BUFFALO

No. 1 heavy melting	*$9.00-$10.00*
No. 2 heavy melting	*$5.00-$5.50*
No. 1 bundles	*$9.00-$10.00*
No. 2 bundles	*$5.00-$5.50*
No. 1 busheling	*$9.00-$10.00*
Machine shop turnings	*21.00-21.50*
Mixed borings, turnings	*26.00-26.50*
Short shovel turnings	*27.00-27.50*
Cast iron borings	*26.00-26.50*
Low phos.	45.00-46.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	*$3.50*
No. 1 machinery	*37.50-38.00*

Railroad Scrap

Rails, random lengths	*41.00-42.00*
Rails, 2 ft and under	*47.00-48.00*
Railroad specialties	*47.00-47.50*

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*28.00-29.00*
No. 2 heavy melting	24.00-24.50
No. 1 bundles	*28.00-29.00*
No. 2 bundles	22.00-22.50
Machine shop turnings	*15.00*
Mixed borings, turnings	*17.50-18.00*
Short shovel turnings	18.50-19.00
No. 1 cast	30.00-31.00
Mixed cupola cast	26.00-28.00
No. 1 machinery cast	38.00-39.00

SEATTLE

(Delivered consumer plant)

No. 1 heavy melting	*$1.00-$2.00*
No. 2 heavy melting	*29.00-$1.00*
No. 1 bundles	*28.00*
No. 2 bundles	23.00
No. 3 bundles	19.00
Machine shop turnings	14.00
Mixed borings, turnings	14.00
Short shovel turnings	14.00
Electric furnace, No. 1	38.00-40.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	30.00-35.00
Heavy breakable cast	25.00-30.00
Unstripped motor blocks	27.00
No. 1 wheels	38.00-40.00
Stove plate	26.00

Railroad Scrap

Rails, random lengths	34.00-35.00

SAN FRANCISCO

No. 1 heavy melting	*27.00*
No. 2 heavy melting	*25.00*
No. 1 bundles	*24.00*
No. 2 bundles	*21.00*
No. 1 busheling	*27.00*
Machine shop turnings	*9.00*
Mixed borings, turnings	*9.00*
Short shovel turnings	*15.00*
Cast iron borings	*15.00*
Cut structurals	*32.00*
Heavy turnings	*15.00*
Punchings & plate scrap	*35.00*
Electric furnace bundles	*24.00*

Cast Iron Grades

No. 1 cupola	39.00
Charging box cast	*35.00*
Stove plate	*37.00*
Heavy breakable cast	*36.00*
Unstripped motor blocks	*29.00*
Brake shoes	*35.00*
Clean auto cast	*39.00*
No. 1 wheels	*39.00*
Burnt cast	*28.00*
Drop broken machinery	*43.00*

LOS ANGELES

No. 1 heavy melting	24.00
No. 2 heavy melting	20.00
No. 1 bundles	23.00
No. 2 bundles	20.00
Machine shop turnings	8.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	37.00-40.00

HAMILTON, ONT.

(Delivered prices)

Heavy melting	$32.50
No. 1 bundles	32.50
No. 2 bundles	32.50
Mechanical bundles	28.50
Mixed steel scrap	28.50
Mixed borings, turnings	28.50
Rails, remelting	32.50
Rails, rerolling	41.50
Busheling	26.50
Busheling new factory:	
Prep'd	30.50
Unprep'd	28.50
Short steel turnings	22.50

Cast Iron Grades

No. 1 machinery cast	46.00-50.00

†F.o.b., shipping point.

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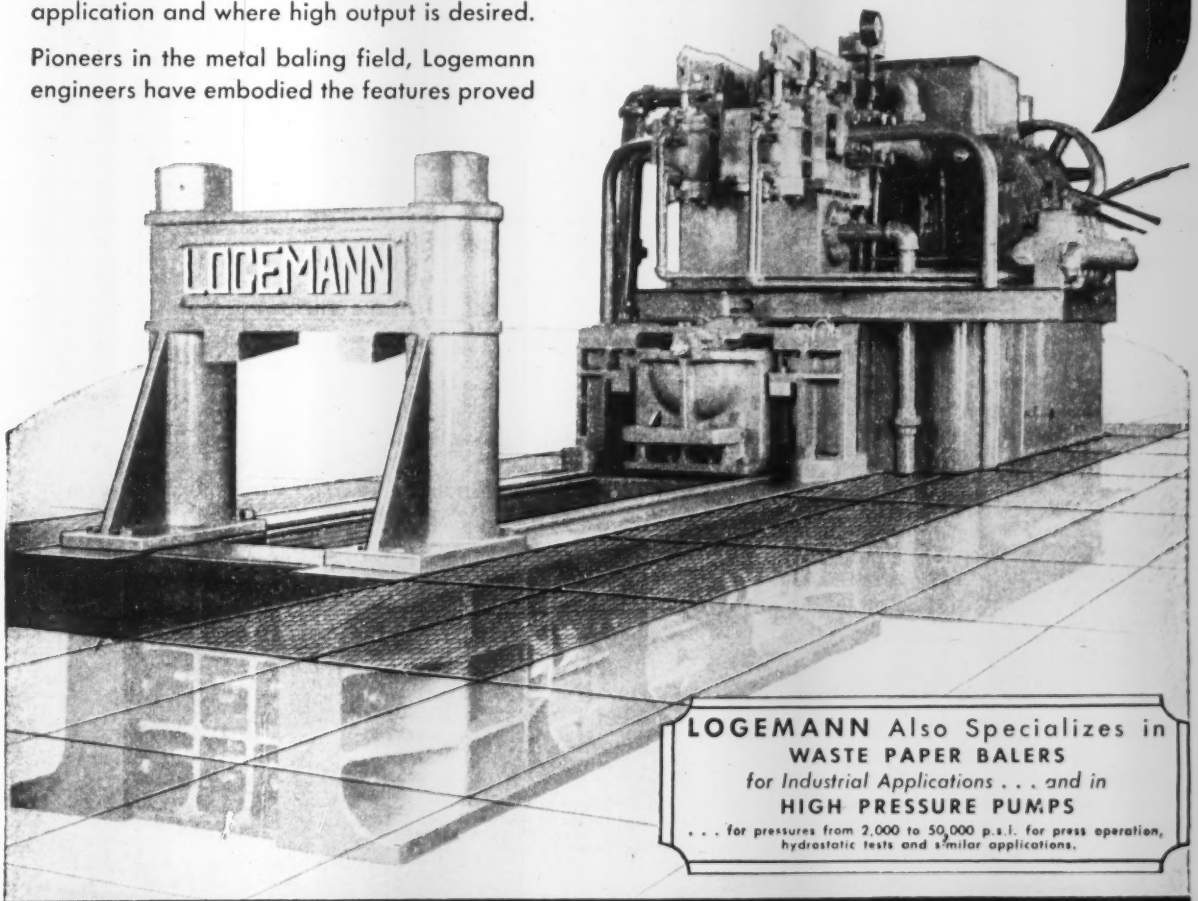

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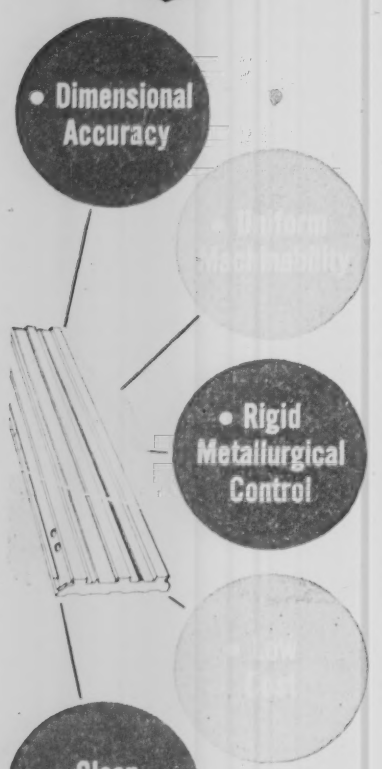

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REINFORCING BARS . . .

REINFORCING BARS PLACED

1100 tons, Chandler pumping project, Columbia Basin project, to Bethlehem Pacific Coast Steel Co., Seattle; A. J. Cheff Construction Co., Seattle, general contractor.

REINFORCING BARS PENDING

550 tons, Garden City state parkway, contract 57, section 2, Passaic county, N. J., bids Sept. 21.

470 tons, Garden City state parkway, contract 22, section 2, Essex county, N. J., bids Sept. 28.

225 tons, Washington state highway span, Snohomish county; general contract to Barrow & Shaffer, Everett, Wash., low $242,903.

220 tons, Washington state overcrossing, Thurston county; Lockyear & White, Longview, Wash., low $237,233.

100 tons, Bureau of Roads bridge, Challes National Forest, Idaho; bids to Boise, Idaho, Sept. 18.

Unstated, two Montana state highway bridges, Hill, Lewis and Clark counties; bids to Helena, Mont., Sept. 16.

Unstated, Army depot, Ft. Richardson, Alaska; bids in at Seattle.

Unstated, telephone building, Helena, Mont.; bids in.

PLATES . . .

PLATES PENDING

Unstated, also shapes, bulk petroleum storage tanks, Hanford Works; Sound Construction & Engineering Co., Seattle, low $1,278,887.

PIPE . . .

CAST IRON PIPE PENDING

Unstated, 20,000 feet 10 to 6-in., also gates and hydrants, for Anchorage, Alaska; bids to Public Works Division, Juneau, Alaska, Sept. 30.

Unstated, 17,000 feet, 8, 6 and 4-in., water mains and accessories; also 150,000-gal. steel reservoir; bids to Forks, Wash., Sept. 21.

RAILS, CARS . . .

RAILROAD CARS PLACED

Canadian Pacific, four rail-diesel cars, to the Budd Co., Philadelphia.

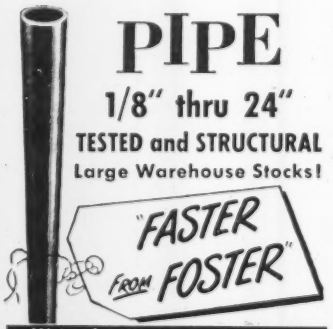
Continental Blacks Inc., Amarillo, Tex., 15 covered hopper cars to the Thrall Car Mfg. Co.

Illinois Central, 100 seventy-ton, round hatch hoppers, to American Car & Foundry Co., Huntington, W. Va.

Southern Pacific 1250 box cars, to own shops, Sacramento, Calif.

RAILROAD CARS PENDING

New York, New Haven & Hartford, 500 to 1000 seventy-ton dropend gondolas, bids asked.



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Tank, 8,000-Gallon, Coiled and Non-Coiled
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